Mark-Recapture Studies of Taku River Adult Sockeye Salmon Stocks in 2003

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Pacific Salmon Commission
Technical Report No. 17

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Mark-Recapture Studies of Taku River Adult Sockeye Salmon Stocks in 2003

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Prepared for:
Pacific Salmon Commission
Transboundary Technical Committee

December 2005

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ABSTRACT

Mark-recapture studies of adult Taku River salmon *Oncorhynchus* stocks were conducted by the Department of Fisheries and Oceans Canada, the Alaska Department of Fish and Game, and the Taku River Tlingit First Nation in 2003. The objectives of the studies were to provide inseason estimates of the inriver abundance of sockeye *O. nerka* and to document biological characteristics (migratory timing, migratory rates and age, sex, and size composition) of Taku River sockeye stocks. Tagged-to-untagged ratios of salmon harvested in the Canadian inriver gillnet fisheries were used to develop the estimates of the inriver abundance of sockeye. A total of 5,969 sockeye salmon were captured in fish wheels located at Canyon Island, Alaska, of which 5,463, were tagged and 1,744 (31.9%) were subsequently recovered in fisheries or on the spawning grounds. The inriver run of sockeye salmon past Canyon Island from June 5 to September 17 was estimated to be 200,918 fish (95% confidence interval 180,905 to 220,931). Canadian commercial, aboriginal and test fisheries harvested 32,933, 267 and 27 sockeye, respectively, resulting in a spawning escapement estimate of 167,691 sockeye salmon. Based on mean date and standard deviation of migration timing the sockeye salmon run was approximately one day earlier and more compressed than the 1984-2002 average. The Kuthai Lake sockeye salmon stocks dominated the early portion of the run, the Little Trapper Lake the middle portion, and the Tatsamenie Lake and mainstem stocks the late portion. The fish wheel catches of 15,604 pink salmon, 262 chum salmon, and 49 steelhead salmon were 2.8%, 50.8% below average and 29.7% above average, respectively. The pink salmon run was five days earlier and slightly more compressed than average.

KEY WORDS: mark-recapture, stratified population estimations, escapement estimation, migratory timing, Taku River, transboundary river, salmon, fish wheel, age, length and sex composition, Pacific Salmon Treaty

INTRODUCTION

Inseason estimates of the spawning escapement of Taku River sockeye *Oncorhynchus nerka* are needed to fulfill the escapement goal and international harvest sharing requirements for stocks specified by the U.S./Canada Pacific Salmon Treaty. The Taku River mark-recapture project has been conducted annually since 1984 (Clark et al. 1986; McGregor and Clark 1987, 1988, 1989; McGregor et al. 1991; Kelley and Milligan 1999; Andel and Boyce 2005) as a joint Canada/U.S. program involving the Alaska Department of Fish and Game (ADF&G) and Division of Fisheries and Oceans Canada (DFO) to provide weekly estimates of the Taku River salmon escapement past Canyon Island, Alaska (Figure 1). The Taku River Tlingit First Nation (TRTFN) began providing a technician to assist with operations in 1994. U.S. and Canadian fishery managers use CPUE and stock composition data from the U.S. District 111 and Canadian Taku River commercial gillnet fisheries and escapement estimates from this project to adjust fishing times, catches, and escapements.

The Taku River is a transboundary river which originates in northern British Columbia and flows southwest through the Coastal Mountain Range and Southeast Alaska to the Pacific Ocean (Figure 1). The Taku River supports numerous stocks of salmon that are harvested by the U.S. and Canada gillnet fisheries. The U.S. drift gillnet fishery primarily targets Taku River sockeye salmon stocks and summer chum salmon from local Alaskan enhancement programs during the summer months and mixed stocks of coho in fall. The U.S. fishery also incidentally harvests chinook and pink salmon. The Canadian inriver fishery targets Taku River sockeye and coho salmon and incidentally harvests chinook and pink salmon. The U.S./Canada Pacific Salmon Treaty (PST) of 1985, and subsequent additions to the original treaty, established conservation (71,000 to 80,000 escapement goal) and harvest sharing (percentage sharing of the allowable catch) objectives for the Taku River sockeye salmon run. The PST mandates cooperative international management of transboundary river stocks. The most intensive cooperative management is directed at sockeye, coho, and chinook salmon.

Mark-recapture methods were used in 2003 to estimate sockeye, chinook and coho salmon escapements. Chinook and coho studies are described in separate reports published by the ADF&G Division of Sport Fish and the Pacific Salmon Commission (in prep.) Fish wheels located at Canyon Island were used to capture sockeye, chinook, and coho for tagging. Tagging data coupled with ratios of tagged to untagged fish in the Canadian fisheries upstream were used to develop escapement estimates inseason.

The fish wheels also catch pink, chum and steelhead salmon. Although abundance is not estimated, the catches do provide an index of interannual variation. This is especially valuable if the entire migration period is bracketed by the period of fish wheel operation (for example, as with pink salmon).

Age, length, and sex data were collected from sockeye, pink, and chum salmon caught in the fish wheels.

OBJECTIVES

The primary goals of the Taku River sockeye salmon tagging program in 2003 were to obtain information on the above-border run size, distribution, migratory timing, and age-sex-size composition of sockeye salmon stocks in the Taku River drainage.

Specific objectives of this study were:

1. Estimate the total spawning abundance of sockeye salmon returning to Canadian portions of the Taku River with an estimated coefficient of variation no greater than 10% of the estimate. Estimate weekly inriver abundance with a coefficient of variation no greater than 20% of the estimate;

2. Estimate the age, length, and sex composition of sockeye salmon migrating past the fish wheel site on a weekly basis;

3. Forecast total abundance of sockeye salmon on a weekly basis based on tag-recovery data and historical migration-timing data;

4. Quantitatively describe the migratory timing (mean and variance) of the sockeye, pink, and chum salmon migrations past Canyon Island; and

5. Estimate the annual age and sex composition of pink and chum salmon migrating past the fish wheel site.

Objectives for the Taku River coho and chinook salmon mark-recapture studies are outlined in project operational plans and reports completed by the ADF&G Division of Sport Fish in consultation with DFO.

METHODS

Study Area Description

The Taku River originates in the Stikine plateau of northwestern British Columbia, and drains an area of approximately 17,000 square kilometres (Figure 1). The merging of two principal tributaries, the Inklin and Nakina Rivers, approximately 50 km upstream from the international border forms the Taku River. The river flows southwest from this point though the Coast Mountain Range and empties into Taku Inlet about 30 km east of Juneau, Alaska. Approximately 95% of the Taku River watershed lies within Canada.

The Taku River is turbid, with much of its discharge originating in glacial fields on the eastern slopes of the Coast Range Mountains. This turbidity precludes complete enumeration of salmon escapements in many areas by aerial or foot surveys. Water discharge in the summer generally increases in proportion to the amount of sunshine received in the interior on coastal mountain ranges (ADF&G 1955). Winter (February) flows range from approximately 40-104 m^3/s at the U.S. Geological Survey water gauging station located on the lower Taku River near Canyon Island (Schellekens et al. 1996). Discharge increases in April and May and reaches a maximum average flow of 700-1,400 m^3/s during June. Flow usually

remains high in July and drops in late August. The efficiency of fish wheels used to capture fish for tagging and the effectiveness of the Canadian commercial fishery are affected by the magnitude of river discharge. Sudden increases in discharge in the lower river result from the release of the glacially impounded waters of Tulsequah Lake (Kerr 1948; Marcus 1960). These floods usually occur once or twice a year between May and August. During water years 1988 to 1995 the instantaneous peak flow due to a Tulsequah event was 2,889 m^3/s (August 17, 1989; Shellekens et al. 1996). During the floods, water levels fluctuate dramatically and the river carries a tremendous load of debris.

Fish Wheel Operation

Migrating adult salmon were captured with two fish wheels at Canyon Island, located approximately 4 km downstream from the international border (Figure 1). Each fish wheel consisted of two aluminum pontoons in a framework, measuring approximately 12 m in length and 6 m in width and filled with closed-cell styrofoam for flotation, supporting an axle, paddle, and basket assembly. Two fish-catching baskets were rotated about the axle by the force of the water current against the baskets and/or paddles. As the fish wheel baskets rotated, they scooped up salmon. V-shaped slides attached to the rib structure of each basket directed fish to aluminum liveboxes bolted to the outer sides of the pontoons.

The fish wheels were positioned in the vicinity of Canyon Island on opposite riverbanks, approximately 200 m apart, and have been operated in identical locations since 1984. They were secured in position by anchoring to large trees with 0.95 cm steel cable and were held out from, and parallel to, the shoreline by log booms. The Taku River channel at this location is ideal for fish wheel operation. The river is fully channelized through a relatively narrow canyon that has very steep walls.

The fish wheels rotated at 0-4 r.p.m., depending on the water velocity and the number of attached paddles. When water levels subsided, more paddles were attached and the fish wheels were moved farther out from shore into faster water currents to maintain a speed of basket rotation adequate to catch fish.

Over time it has become clear that Tulsequah River floods are preceded by a sudden decline in river temperature and a corresponding rapid increase in river level. It is standard operating procedure to stop the fish wheels when river levels near 290 cm (114 inches, standardized gauge measure). By stopping the fish wheels during high water events a great deal of labour and material cost is saved by reducing damage to the fish wheels.

Baskets and liveboxes are removed from the pontoons and stored on high ground during the off season. The pontoons are towed upstream to a backwater slough and securely moored during the off season.

Tagging and Sampling Procedures

All sockeye captured in the fish wheels were sampled for sex and mid-eye to fork of tail length (MEF). In addition, a sub-sample of 260 sockeye salmon per week were sampled for scales. Clicthral arch to fork of tail (CAF) length measurements were taken from 200 sockeye salmon throughout the season, and paired with MEF measurements. Canadian fish buyers prefer a headless, gutted product; because of this the only length measurement available from the commercial fishery was CAF. The paired MEF and CAF measurements from the fish wheels allowed conversion of CAF measurements to MEF.

All chum salmon were sampled for sex, scales, and MEF length. The daily sampling goal for pink salmon was 25 fish; these fish were sampled for sex and MEF length.

All uninjured sockeye greater than 350 mm (MEF length) were tagged with numbered spaghetti tags. Sockeye less than 350 mm (MEF) were not tagged because fish in this size range are virtually unsusceptible to capture in the upriver gillnet fishery from which tagged to untagged ratios are used to develop population estimates for these species. Sockeye salmon with serious wounds (most often thought to be seal inflicted) were not tagged. Pink, chum and steelhead salmon were not tagged.

Salmon were dipnetted from the fish wheel liveboxes into a tagging trough partially filled with river water. Spaghetti tags (Floy Tag and Manufacturing Inc., Seattle, WA)[3] were applied to sockeye salmon as follows: one person held the fish in the tagging trough while a second person inserted a 15 cm applicator needle and attached spaghetti tag through the dorsal musculature immediately below the dorsal fin. The ends of the spaghetti tag were then knotted together with a single overhand hitch. Biological sampling was also conducted during application of the spaghetti tags. Sex and length measurements were recorded, and scale samples taken from all chum salmon, and sub-samples of the sockeye salmon caught. Sex and length data were also collected daily from a sub-sample of 25 pink salmon, but scales were not taken from this species. The tagging and sampling procedures took from 40 to 60 seconds per fish to complete. The fish were then immediately and gently released back into the river.

The spaghetti tags used for sockeye salmon were made of hollow fluorescent orange PVC tubing (approximately 2.0 mm in diameter and 30 cm in length) and were consecutively numbered and labeled with project description information.

In general, fish wheel catches were sampled in the morning, afternoon, and evening. Less frequent checks, morning and evening, were made during lulls in the migration to minimize crew overtime. During peak migration times catches were sampled more frequently, early in the morning and late at night.

Tag Recovery

Sockeye were inspected for tags in Canadian commercial and test fisheries, as well as in a catch-and-release gillnet fishery conducted by DFO. These fisheries occurred in Canadian portions of the Taku River within 20 km of the international border. Catches that were not associated with tag recovery data were censored, for example the aboriginal ("food fish") catch. All sockeye salmon caught in the commercial and test fisheries were considered to have been examined for tags and all of the captured tags were considered to have been recovered. All sockeye caught in the catch-and-release fishery were examined for tags by DFO personnel.

The commercial fishery operated from two to five days per week from mid-June through early September. Until mid-August, it targeted sockeye salmon; after this, coho salmon. The test fishery took place from late April to mid-June and targeted chinook salmon. The catch-and-release fishery was conducted from mid-August through early October and targeted coho salmon. Drift and set gillnets were the gear types used; the mesh size was 13 cm (5 ¼ inches) to 15 cm (5 $^{7/8}$ inches) in the commercial and catch-and-release fisheries and 18.5 cm (7 ¼ inches) in the test fishery. The wooden fish wheel owned and operated by the TRTFN for commercial and food fish purposes was not deployed in 2003.

A cash reward of $5.00 (Canadian) was offered by DFO to commercial fishers for each sockeye tag returned with information on the date and location of recapture. Canadian catch statistics and tags were collected daily (when the fishery was open) by DFO personnel stationed at Canyon Island. Catch statistics were communicated to the DFO office in Whitehorse via single side band radio or satellite telephone and

[1] Mention of trade names does not constitute endorsement by ADF&G or DFO.

then relayed to the ADF&G office in Juneau. A limited number of tags were also recovered from the U.S. inriver personal use fishery and the District 111 gillnet fishery. ADF&G offered a $2.00 (U.S.) reward for each tag returned from these fisheries, and conducted a lottery after the season to award a $100.00 bonus to one of the U.S. fishers that returned tags.

Tag observations and recoveries were also made at enumeration weirs located at Little Trapper, Tatsamenie, Kuthai and King Salmon lakes. Additional recoveries were made in incidentally to chinook work on the Nakina and Nahlin rivers as well as on directed sampling excursions to the mainstem Taku River spawning grounds.

Sex, length measurements, and scale data were obtained from the various fisheries, the enumeration weirs, and the Nahlin River and mainstem Taku spawning area.

Tagging and tag recovery data were organized by statistical week for analysis. Statistical weeks begin at 00:01 AM Sunday and end the following Saturday at midnight, with weeks being numbered sequentially beginning with the week encompassing the first Saturday in January. Inclusive dates for 2003 statistical weeks are shown in Appendix A.1.

Statistical Methods

Sockeye salmon tagging data, tag recovery data and catch data were entered into an abundance estimation program which is referred to as the Stratified Population Analysis System (SPAS) (Arnason et al. 1996). This model provides stratified population estimates using maximum likelihood techniques (Plante 1990) and associated variances when s (the number of tagging stratum) and t (number of recovery stratum) are not equal. For cases in which $s=t$, the model provides stratified population estimates based on Chapman and Junge (1956) and Darroch (1961). This stratified method was used because it allows the probabilities of capture in tagging and recovery strata to vary across the strata.

Assumptions necessary to form consistent (i.e., approaching unbiased as sample size increases) stratified mark-recapture estimates in this study include (Arnason, et al. 1996):

1. All fish that pass Canyon Island during the period of interest have a non-zero probability of recovery in the commercial fishery and all fish caught by the fishery have a non-zero probability of being tagged (i.e., the population is closed);

2. There is no tag loss, tag induced mortality, tag mis-identification or non-reporting. Should any of these occur, they are to be estimated and adjusted for;

3. All fish, tagged or not, are independently caught with the same probability in any given recovery stratum;

4. All fish, tagged or not, move from a given release stratum to the recovery strata independently with the same probability distribution; and

5. There are no release strata or recovery strata where no tags are released or found respectively, and there are no rows or columns of the release-recovery matrix which are linear combinations of other rows or columns respectively.

The first assumption is addressed by the fact that two fish wheels are used in a consistent manner throughout the season and that the inriver fishery is conducted weekly. For the second assumption, tag-induced mortality was shown to be insignificant in a holding study conducted by McGregor and Milligan (1991, unpublished data). The extent of tag loss by shedding, misidentification, or non-reporting, was also found to be negligible in that study and several subsequent ones (e.g. Kelley et al., 1997). The third and fourth assumptions have not been assessed, while the fifth assumption is met by pooling of various recovery or release strata.

Inriver sockeye salmon run estimates were generated on an inseason basis in 2003. Mark-recapture data was forwarded to the Douglas ADF&G and Whitehorse DFO offices after each day of the commercial fishery. Data was analyzed and inriver abundance estimates were developed. Historical migratory timing data was then used each week to project the total inriver run size for the season. Due to the estimated three to four days travel time for fish between the Taku Inlet gillnet fishery and Canyon Island (Clark et al. 1986), as well as between Canyon Island and the Canadian fishery (based on current year tag recovery data), our estimates of inriver abundance corresponds with the movement of Taku River sockeye salmon through District 111 approximately one to two weeks earlier.

Fishery management decisions that affect the magnitude and distribution of harvests and escapements are based in principle on the measured or perceived abundance of fish through time. Mundy (1982) described a set of statistics, termed migratory timing statistics, useful for characterizing the annual timing of fish migrations and for comparing the timing of migrations between years. Abundance per unit of time is divided by the total abundance throughout the migration to generate a time series of proportions, or time density. The shape of the time density characterizes the timing and temporal distribution of the migration. Two simple features of the time density are the mean date and variance or dispersion of the migration through time. We used fish wheel CPUE as an index of the abundance of fish migrating past Canyon Island, and calculated migratory timing statistics following the procedures of Mundy (1982). The mean date of passage in a migration of *m* days was estimated by:

$$\bar{t} = \sum_{t=1}^{m} t * P_t \quad , \qquad (1)$$

where $\bar{t}$ was the mean day of the migration (t=1 was the first day of the migration and m was the last day), and P_t is the proportion of the total cumulative fish wheel CPUE that occurred on day t. The calculated mean date is reported as the corresponding calendar date.

The variance of the migrations was estimated by:

$$s_t^2 = \sum_{t=1}^{m} (t - \bar{t})^2 * P_t \quad , \qquad (2)$$

The timing of individual sockeye salmon stocks past Canyon Island was derived from recoveries of tagged fish on the spawning grounds and was weighted by fish wheel CPUE to permit the escapement of a particular stock to be apportioned to week of passage past Canyon Island. The formula we used for determining the proportion of the run occurring each week for each stock was:

$$\frac{\frac{C_k * T_{ks}}{T_k - T_{kc}}}{\sum_{j=22}^{38} \frac{C_k * T_k}{T_K - T_{kc}}} \quad , \qquad (3)$$

where: k is the statistical week of interest; C_k is the weekly proportion of the total season's fish wheel CPUE, T_{ks} is the number of spawning ground recoveries of stock s that were tagged in week k, T_k is the number of fish tagged at Canyon Island in statistical week k, and T_{kc} is the number of fish tagged at Canyon Island in statistical week k and caught in the Canadian fishery.

An assumption implicit in this calculation is that the removal of fish by the Canadian inriver fishery does not alter the migratory timing distribution of individual stocks. This assumption may be violated because the Canadian fishery harvest rate of the inriver run varied between fishing periods.

RESULTS

Fish Wheel Operation

Fish wheels were operated on the Taku River from May 20 through October 4, except for August 10, and September 18 through September 25, when both were shut down due to extreme high and low river levels respectively. Fish wheel I, located furthest upriver, was installed on June 6; fish wheel II was installed on May 20. Additional details regarding operations are presented in Appendix B.1.

The aluminum two-basket configuration first used in 1996 has proven to be effective at very low river levels (as measured on a permanent staff gauge).[4]

Fish Wheel Catches

Daily catches of sockeye, pink, chum, and steelhead salmon in the Canyon Island fish wheels are listed in Appendices B.1. to B.4. Dates of operation and the total fish wheel catch by species for the 1984 to 2003 period are presented in Table 1. Graphs of the fish wheel CPUE for sockeye, pink, and chum salmon are included in Figure 3.

The total catch of sockeye salmon in the Canyon Island fish wheels in 2003 was 5,969, 10.6% above the 1984 to 2002 average and similar to the catches from each of the previous three years. (Table 1; Appendix B.1). Catches occurred from June 5 through September 17, and peaked during statistical week 29 (July 13 to July 19), when 1,615 sockeye salmon were captured. Prior to the first Canadian and U.S. commercial fishery openings on June 15 (statistical week 25), 88 sockeye salmon (1.5% of the season total) had been captured in the fish wheels (Appendix B.1). As in past years, the daily catches fluctuated dramatically. The effects of the U.S. commercial fishery in Taku Inlet were observable as fish wheel catches declined to their lowest levels between Thursday and Saturday weekly; this suggested that the average travel time between Taku Inlet and Canyon Island was three to four days.

The total 2003 pink salmon catch in the fish wheels at Canyon Island was 15,604 (Table 1; Appendix B.2), 2.8% below the 1984 to 2002 average. Catches during odd years have been slightly greater than those during even years since 1998. This may signify a return towards odd-year dominance. Fish wheel catches from 1992 through 1998 were even year dominant averaging 25% more than odd year catches for this period. The peak daily catch of pink salmon in 2003 (983 fish) occurred on July 8. The 2003 fish wheel catch of chum salmon was 262, well below the 1984 to 2002 average of 530. The peak daily catch of chum salmon (30 fish) occurred on September 14 (Appendix B.2). The fish wheel catch of steelhead was 49, above the 1984 to 2002 average of 74.

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[4] The aluminum baskets were experimentally used in 1996. Previous programs were constrained by low water conditions, particularly in the fall, which would not effectively turn the fish wheels.

Tagging and Recovery Data

Of the 5,969 sockeye salmon caught in the Taku fish wheels, 5,463 were tagged (91.5%). Only jack sockeye salmon (fish smaller than approximately 350 mm MEF that have spent only one year at sea) or sockeye with noticeable injuries were not tagged. Daily numbers of sockeye caught and tagged are listed in Appendix B1. Recoveries downstream of Canyon Island totaled 50 (0.9% of tags applied), leaving 5,413 available for recapture in Canadian fisheries. The Canadian commercial fishery recaptured 935 tagged sockeye and accounted for 99.8% of the total sockeye tags recovered or observed in upstream fisheries (Table 2). No tags were recovered in the Canadian test fishery; the catch-and-release fishery recovered 2 (0.2%) tags. Tags were also observed in terminal areas, principally Little Trapper, Tatsamenie and Kuthai lakes. These numbered 1,150, 91, and 86 respectively. The escapements to these locations numbered 31,227, 4,515, and 7,769 sockeye respectively.

Escapement Estimates

Ratios of tagged to untagged sockeye salmon in the Canadian commercial, test and catch-and-release gillnet fisheries were used to estimate the magnitude of the inriver run of sockeye salmon that passed Canyon Island during the period of June 5 to September 17, 2003.

A total of 937 tags with corresponding recovery date information were returned from 33,153 sockeye salmon examined in the Canadian fisheries (Table 3). Tagging data from statistical weeks 33 through 39 (August 10 through September 27) were pooled due to the limited number of tags out in this period, which marked the end of the run. Recovery data from statistical weeks 26 (starting June 22), 27 (starting June 29) and 30 (starting July 20) were treated separately due to changes in tag recovery rates. Tagging and recovery data were grouped into 11 and seven strata, respectively (Table 4). Using a maximum likelihood Darroch estimator, we estimated that 200,918 sockeye salmon passed Canyon Island between June 5 and September 17. The approximate 95% confidence interval associated with the estimate was 180,905 to 220,931fish. The 2003 estimate of 200,918 sockeye salmon is the highest on record (slightly above the 2001 estimate), and 157.6% of the 1984 to 2002 average (127,450 sockeye salmon; Table 5; Figure 4; TTC 2003).

The Taku River sockeye salmon run above Canyon Island was exploited by the Canadian fisheries at an estimated rate of 16.4%, compared to a 1984-2002 average of 19.8% (range 11.6 to 31.2%; Table 5). After removal of 32,933, 267, and 27 sockeye salmon by the Canadian commercial, aboriginal and test fisheries respectively, from the estimated escapement to the Canada/U.S. border, the spawning escapement totaled an estimated 167,691 fish (Table 4). As with inriver run, this is the highest escapement observed since the program began in 1984.

The escapement estimate does not include two groups of sockeye salmon that spawn in the drainage: (1) fish that spawn in streams located downriver from Canyon Island, and (2) jack sockeye salmon. The number of sockeye salmon spawning downstream from Canyon Island is unknown but presumed to be small. Small numbers of sockeye salmon have been observed annually in lower tributaries of the lower Taku River (i.e. Fish Creek, Sockeye Creek, and Yehring Creek) during annual aerial and foot surveys (McGregor, personal communication; Figure 1). The contribution of jacks can represent a sizable portion of the Taku River run; the contribution of jack (one ocean) sockeye salmon to the Canyon Island fish wheel catches from 1983 to 2002 averaged 4.2% (range 0.0 to 9.1%; Table 6). In 2003 the contribution of jacks was 4.0%.

A necessary assumption of the population estimation technique used is that all fish in a particular recovery stratum, whether tagged or untagged, have the same capture probability. A factor that could violate this

assumption is that tagging and recapture gear are selective for different sized fish. Based on length frequency distributions of sockeye salmon tagged at the fish wheels and of tagged sockeye recovered in the commercial fishery it is clear that the fish wheels tend to capture a higher proportion of smaller fish or the fishery captures a higher percentage of large fish (Figure 5).

In past years (Kelley et al. 1996, McGregor et al. 1991) the possible effects of size selectivity on the sockeye salmon population estimate were assessed by stratifying tagging and recovery data by size class. Results for those years demonstrate that the mark-recapture estimates are robust in respect to fish length differences between the tagging and recapture events. The summed abundance estimates obtained for large and small sockeye salmon separately were not significantly different than the pooled estimates. Based on those results the 2003 mark-recapture data was not examined by fish size.

Migratory Timing

The mean date (July 18) and standard deviation (16.2 days) of the sockeye salmon run in 2003 differed only slightly from 1984-2002 averages (July 20 and 18.9 days; Table 7). The 2003 run was just two days earlier than average but was more compressed. Migratory timing statistics (mean date July 14; standard deviation 7.7 days) showed the pink salmon run timing was six days earlier than average and, like the sockeye salmon run, more compressed (averages for mean date and standard deviation were July 20 and 8.2 days respectively). The migratory timing relative to average for chum salmon is more difficult to assess because the duration of fish wheel operations has varied between years and has failed to cover the complete migration of this species. Assuming fish wheel CPUE in 2003 was reflective of the run, the mean date of migration was September 7 (standard deviation 13.6 days). However, it is likely that this assumption was not completely valid as there was an interruption in fish wheel effort during the run (from September 18 through 25) and there were still a small number of chum being caught at the time of fish wheel demobilization.

Sockeye Salmon Stock Timing

The timing of three individual stock groups of sockeye salmon past Canyon Island in 2003 was determined using recoveries of tagged fish from enumeration weirs (Table 8; Figure 6). These were weirs on the outlet streams of Little Trapper (565 tags), Tatsamenie (73 tags), and Kuthai (86 tags) lakes (Table 2.).

The Kuthai Lake stock migrated past Canyon Island the earliest of these three stocks examined. These fish were passing Canyon Island from statistical weeks 24 to 29 (June 8 to July 19). The peak of the Kuthai Lake migration took place during statistical week 27 (June 29 to July 5).

Little Trapper Lake sockeye salmon were present at Canyon Island during statistical weeks 26 to 33 (June 22 to August 16). The peak of the Little Trapper Lake migration occurred during statistical week 29 (July 13 to July 19).

The Tatsamenie Lake stock exhibited the latest return timing; tagged fish bound for this system were present at Canyon Island between statistical weeks 28 to 36 (July 6 to September 6). The peak week of migration for Tatsamenie Lake sockeye was statistical week 32 (August 3 to August 9).

Inriver Sockeye Salmon Migration Rates

Inriver travel times of three headwater stocks could be determined from the recovery of tagged fish at enumeration weirs as described in the previous section (Table 9). Inriver travel times from Canyon Island for the Kuthai Lake, Little Trapper Lake and Tatsamenie Lake stocks are shown in Figure 7. Travel times averaged 28.4, 25.4 and 33.7 days for each of these respective stocks.

The travel time for Kuthai Lake sockeye salmon was slightly below the 1998 to 2002 average (36.5 days). The travel times for Little Trapper and Tatsamenie lakes sockeye salmon are within 10% of their respective averages (27.4 and 31.9 days).

Migration rates generally increased over the course of the run. Kuthai Lake fish tagged in statistical week 24 averaged 38.3 days in transit, while those tagged in statistical week 29 averaged 23.3 days. For the Tatsamenie stock, fish tagged in statistical week 28 averaged 46.5 days in transit while fish tagged in statistical week 36 averaged 19.0 days. Little Trapper Lake fish tagged in statistical week 26 averaged 36.6 days in transit while those tagged in statistical week 33 averaged 18.8 days.

Age, Length, and Sex Composition

The age and sex compositions, by sex and time period, of the Canyon Island fish wheel catches of sockeye and chum salmon in 2003 are summarized in Appendices C.1 and C.2. Lengths at age are presented in Appendices D.1 and D.2.

For sockeye salmon, age-1.3 fish were most prevalent (54.4%) with age-1.2 fish comprising 24.9%, age-2.2 1.1%, age-1.1 3.5%, age-0.2 6.8%, age-2.3 1.2%, age-0.3 7.6%, and very small numbers of age-0.1, 2.1, 0.4, and 1.4, and 3.2, fish (Table 6). The lengths of age 1.2 and 1.3 sockeye salmon were comparable to the 1983 to 1998 averages (Table 10). Male sockeye salmon were more prevalent (53.4%) than females (Appendix D.1).

Fish wheel catches of chum salmon were primarily comprised of age-0.3 (72.9%) fish, considerably above the 1983-2002 average of 50.7% (Table 11). Age-0.4 fish constituted 23.1% of the fish wheel catch. Female chum salmon were more prevalent (54.7%) than males (Appendix D.2). The average length at age for chum salmon passing Canyon Island was 564, 612, and 644 mm (MEF) for age 0.2, 0.3, and 0.4 fish respectively; this was below the 1983 to 1998 average (Table 12).

DISCUSSION

The accuracy of mark-recapture studies in providing estimates of abundance is dependent on the degree to which the underlying assumptions of the analytical methods used are satisfied. We have chosen to use a stratified Darroch type estimator for our Taku River sockeye abundance estimates because we have different capture probabilities in the tagging and recovery strata due, primarily, to fluctuations in river level. In estimating the abundance of adult sockeye salmon in the Taku River we assumed: (a) tagging of adult sockeye salmon was in proportion to their numbers immigrating over time; (b) no sockeye salmon entered or left the system between the tagging and recovery events or sockeye salmon that made up the population of the capture strata have a non-zero probability of recapture during the recovery event; (c) no tag-induced mortality occurred; (d) the probability of recovering sockeye salmon is independent of its tagged/untagged status. Assumptions underlying this model, outlined above, have been examined at various times during the course of this project (Kelley et al. 1997, McGregor et al. 1991).

With respect to assumption (a), tagging efforts at the Taku River fish wheels and recovery efforts at the Canadian commercial and test fisheries were conducted on a frequent basis through the season. Both of the fish wheels were strictly maintained and adjusted throughout the entire sockeye salmon run. The wheels operated 24-hours per day except during equipment breakdowns; however it is known that river conditions affect the fishing efficiencies of both wheels. Recovery efforts were conducted a minimum of twice per week throughout the season, but water conditions can also affect the efficiency of commercial and test fishery set and drift nets. We are able to work around these variations in gear efficiency by using the Darroch stratified estimator for generating abundance estimates; this allows the probabilities of capture in tagging and recovery strata to vary across time but not within these strata.
It was likely that assumption (b) was violated in recent years of the Taku sockeye mark–recapture program because there were significant differences in the cumulative distribution function of length between fish sampled at the fish wheels and at the recovery location (Figure 5). Smaller fish were more prevalent in fish wheel samples than among the recovery samples. Stratification of mark–recapture data by size would remove possible bias in population estimates caused by differences in capture probabilities due to fish size (Bernard and Hansen 1992). In past studies, summed abundance estimates obtained for large and small sockeye salmon were not significantly different than the pooled estimates (Andel and Boyce, 2004). Based on those results the mark-recapture data for 2003 was not examined by fish size. We were able to make some correction for this possible bias by completely removing smaller "jack" salmon (less than or equal to 360 mm MEF length) from tag and recovery data.

We were able to assess the short-term loss of tags caused by physical breakage or shedding. Fish that lose their spaghetti tags are readily identifiable by the presence of entrance and exit holes just below the dorsal fin created during tag application. Those holes effectively serve as a secondary mark. A substantial number of fish were recaptured in the fish wheels shortly after tagging. In the fish wheels, no sockeye or coho salmon were found throughout the season that had the needle hole "secondary mark" and no spaghetti tag. These results are consistent with those observed in previous years. In addition, in statistical weeks 25 through 33, over 1,800 fish were examined for tagging needle marks in the Canadian commercial fishery, after fishers had removed tags. The numbers of tagging needle holes was compared with tag recovery rates, and found to be consistently lower (Appendix E.1). (An additional 26 fish were examined in the spring test fishery; no tagging needle holes were observed and no tags had been recovered). This does not support the hypothesis that there is tag loss between the fish wheels and the

fishery. We therefore believe that breakage or shedding of tags among sockeye subjected to the inriver fishery is minimal or nonexistent. The close proximity of the fishery to the tagging site (4 km) results in a very short travel time between the two locations.

Other data that can be used to infer the degree of short term tag loss are the tagged to untagged ratios of fish in the inriver fishery and at upstream recovery locations. In the commercial, test, and catch-and-release fisheries the pooled tagged to untagged ratio for sockeye salmon was 2.8 %, while it was 3.1% in the pooled recovery sample from six different spawning areas, (3.0% in the principal recovery areas i.e., Kuthai, Little Trapper and Tatsamenie lakes). While this data is not conclusive evidence that significant tag loss is not occurring, it does generally support the findings of more rigorous experiments; short-term tag loss appears to be negligible for the sockeye mark-recapture program. If tag loss is occurring it would be most pronounced at the upstream locations due to increased travel time (Table 9).

Fish wheels were not modified in 2003 and functioned effectively. As in recent years, a 2-basket configuration was used for the entire season.

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Table 1. Canyon Island fish wheel dates of operation and catches of sockeye, pink and chum salmon 1984 to 2003.

Year	Dates of Operation	Sockeye	Pink	Chum	Steelhead	Dolly Varden
1984	6/15-9/18	2,334	20,751	316	NA	NA
1985	6/16-9/21	3,601	27,670	1,376	NA	NA
1986	6/14-8/25	5,808	7,256	80	14	2,716
1987	6/15-9/20	4,307	42,786	1,533	38	868
1988	5/12-9/19	3,292	3,982	1,089	37	701
1989	5/5-10/1	5,650	31,189	645	34	1,308
1990	5/3-9/23	6,091	13,358	748	33	1,433
1991	6/8-10/15	5,102	23,553	1,063	135	326
1992	6/20-9/24	6,279	9,252	189	22	241
1993	6/12-9/29	8,975	1,625	345	30	375
1994	6/10-9/21	6,485	27,100	367	107	584
1995	5/4-9/27	6,228	1,712	218	65	509
1996	5/3-9/20	5,919	21,583	388	65	681
1997	5/3-10/1	5,708	4,962	485	102	454
1998	5/2-9/15	4,230	23,347	179	120	323
1999	5/14-9/28	4,639	23,503	164	76	330
2000	5/14-10/3	5,865	6,529	423	159	244
2001	5/27-9/27	6,201	9,134	250	125	196
2002	5/19-9/14	5,812	5,672	205	90	419
2003	5/20-10/4	5,969	15,604	269	96	350
Average (84-02)		5,396	16,051	530	74	689
Average (84-97)		5,413	16,913	632	57	850
Average (84-98)		5,334	17,342	601	62	809
Average (84-99)		5,291	17,727	574	63	775
Average (84-00)		5,324	17,068	565	69	740
Average (84-01)		5,373	16,627	548	73	706

Table 2. Summary of Canyon Island sockeye tag recoveries by location and species, 2003.

	Tags Recovered	Tags Observed Only	Total	Fish Inspected	Tag Ratio	Percent Tags Observed
Canadian Commercial	935	0	935	32,933	2.8%	17.1%
Test Fishery	0	0	0	27	0.0%	0.0%
Catch & Release Fishery	2	0	2	197	1.0%	0.0%
Kuthai Lake	86	0	86	7,769	1.1%	1.6%
Little Trapper Lake	565	585	1,150	31,227	3.7%	21.1%
Tatsamenie Lake	73	18	91	4,515	2.0%	1.7%
King Salmon Lake	21	82	103	2,970	3.5%	1.9%
Taku River mainstem	14	0	14	514	2.7%	0.3%
Nahlin River	0	0	0	50	0.0%	0.0%
Tatsatua Creek	2	0	2	na	na	0.0%
U.S. Downstream	50	na	50	na	na	0.9%

Table 3. Tagging and recovery data from the 2003 Taku River sockeye salmon mark-recapture program. Data includes umber of sockeye salmon tagged at Canyon Island and recovered above the border in the inriver Canadian commercial, test angillnet catch & release fisheries by statistical week (downstream recoveries excluded).

Statistical Week of Tagging	Statistical Week of Recovery																	Total Tags Recovered	Total Tags Applied	Tag Ratio Recovered/ Applied
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39			
23	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11	0.091
24	0	0	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	10	71	0.141
25	0	0	10	11	0	0	0	0	0	0	0	0	0	0	0	0	0	21	138	0.152
26	0	0	0	37	24	0	0	0	0	0	0	0	0	0	0	0	0	61	214	0.285
27	0	0	0	0	92	52	2	0	1	0	0	0	0	0	0	0	0	147	752	0.195
28	0	0	0	0	0	104	61	2	0	0	0	0	0	0	0	0	0	167	1055	0.158
29	0	0	0	0	0	0	183	65	2	0	0	0	0	0	0	0	0	250	1477	0.169
30	0	0	0	0	0	0	0	135	26	2	0	0	0	0	0	0	0	163	641	0.254
31	0	0	0	0	0	0	0	0	42	30	0	0	1	0	0	0	0	73	354	0.206
32	0	0	0	0	0	0	0	0	0	21	13	0	1	0	0	0	0	35	368	0.095
33	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	93	0.022
34	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	6	115	0.052
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0.000
36	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	50	0.020
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0.000
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0.000
Total	0	0	19	50	116	156	246	202	71	53	14	5	4	1	0	0	0	937	5,413	0.173
Examined for tags:																				
Commercial	0	0	1,423	3,232	4,748	3,393	5,911	6,942	3,430	2,404	1,090	195	89	53	23	0	0	32,933		
Test	2	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27		
Catch & Release	0	0	0	0	0	0	0	0	0	0	0	14	102	43	24	4	6	193		
Sum	2	25	1,423	3,232	4,748	3,393	5,911	6,942	3,430	2,404	1,090	209	191	96	47	4	6	33,153		

Table 4. Pooled-strata tagging and recovery data used to calculate mark-recapture estimates of the inriver sockeye salmon run past Canyon Island, 2003.

Statistical Week of Tagging	Statistical Week of Recovery							Total Tags Recovered	Total Tags Applied	Tag Ratio
	23-25	26	27	28-29	30	31-32	33-39			
23-24	9	2						11	82	0.134
25	10	11						21	138	0.152
26		37	24					61	214	0.285
27			92	54		1		147	752	0.195
28				165	2			167	1055	0.158
29				183	65	2		250	1477	0.169
30					135	28		163	641	0.254
31						72	1	73	354	0.206
32						21	14	35	368	0.095
33							2	2	93	0.022
34-38							7	7	239	0.029
Total	19	50	116	402	202	124	24	937	5,413	0.173
Examined	1,450	3,232	4,748	9,304	6,942	5,834	1,643	33,153		
Marked Ratio	0.013	0.016	0.025	0.045	0.030	0.022	0.015	0.029		
Border Escapement	13,730	9,828	20,349	60,518	26,743	25,883	43,974	200,918		
95% Lower C.I.								180,905		
95% Upper C.I.								220,931		
Fishery Removals[a]	1,450	3,232	4,748	9,304	6,942	5,834	1,450	33,227		
Spawning Escapement	12,280	6,596	15,601	51,214	19,801	20,049	42,331	167,691		

[a] Aboriginal harvest not available by week.

Table 5. Historical sockeye salmon above border abundance, above border harvests, and escapement Taku River, 1984 to 2003.

Year	Border Escapement	Canadian Harvest	Harvest Rate	Spawning Escapement	Total Run	U.S. Harvest
1984	141,254	27,292	0.193	113,962	199,796	58,543
1985	123,974	14,411	0.116	109,563	198,703	74,729
1986	115,045	14,939	0.130	100,106	175,980	60,934
1987	96,023	13,887	0.145	82,136	151,178	55,154
1988	92,641	12,967	0.140	79,674	118,452	25,811
1989	114,068	18,805	0.165	95,263	177,435	63,367
1990	117,573	21,474	0.183	96,099	226,865	109,292
1991	154,873	25,380	0.164	129,493	259,804	104,931
1992	167,376	29,862	0.178	137,514	291,031	123,655
1993	142,148	33,523	0.236	108,625	284,387	142,239
1994	131,580	29,001	0.220	102,579	229,737	98,157
1995	146,450	32,711	0.223	113,739	238,448	91,998
1996	134,651	42,025	0.312	92,626	323,047	188,396
1997	95,438	24,352	0.255	71,086	174,779	79,341
1998	91,548	19,038	0.208	70,715	142,194	50,646
1999	113,705	20,681	0.182	92,562	178,286	64,581
2000	115,693	27,942	0.242	87,298	248,539	132,846
2001	192,269	47,988	0.250	144,071	400,739	208,470
2002	135,233	31,053	0.230	103,343	252,686	117,453
2003	200,918	32,933	0.164	167,691	337,768	136,850
Average(84-02)	127,450	25,649	0.198	101,603	224,847	97,397
Maximum(84-02)	192,269	47,988	0.312	144,071	400,739	208,470
Minimum(84-02)	91,548	12,967	0.116	70,715	118,452	25,811
S.D.(84-02)	26,591	9,486	0.050	20,375	68,911	47,266
C.V.(84-02)	20.9%	37.0%	25.3%	20.1%	30.6%	48.5%
Average(84-98)	124,309	23,978	0.191	100,212	212,789	88,480
Average(84-99)	123,647	23,772	0.191	99,734	210,633	86,986
Average(84-00)	123,179	24,017	0.194	99,002	212,862	89,684
Average(84-01)	127,017	25,349	0.197	101,506	223,300	96,283

Table 6. Historical age composition of sockeye salmon passing Canyon Island, Taku River, 1983 to 2003.

	Sample	Percent By Age Class													
Year	Size	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3
1983	1,574	0.0	0.4	0.0	5.7	16.6	0.0	0.0	62.5	7.6	0.2	7.4	0.0	0.0	0.1
1984	1,583	0.3	2.1	1.8	11.5	15.4	0.2	0.2	57.0	9.2	0.3	2.8	0.0	0.0	0.0
1985	2,437	0.3	6.0	4.1	4.0	17.2	0.4	0.4	53.8	8.7	0.7	4.8	0.0	0.1	0.0
1986	3,468	0.0	2.9	0.4	6.3	29.7	0.1	0.0	50.2	2.4	0.3	8.0	0.0	0.0	0.0
1987	2,987	0.8	1.0	5.0	12.7	17.3	2.0	0.2	54.2	2.3	0.2	4.6	0.0	0.1	0.0
1988	2,450	0.3	6.5	6.2	8.0	29.8	0.3	0.0	38.7	5.6	0.2	4.6	0.1	0.0	0.0
1989	4,272	0.3	3.0	4.2	7.0	19.5	0.4	0.0	58.3	3.3	0.2	4.0	0.0	0.0	0.0
1990	4,489	0.4	4.9	3.6	4.7	26.3	0.2	0.1	48.5	6.4	0.3	4.8	0.0	0.0	0.0
1991	3,594	0.1	7.9	3.3	9.5	31.4	0.8	0.1	37.7	4.9	0.3	4.4	0.0	0.0	0.0
1992	1,678	0.3	7.1	3.0	12.3	26.7	0.7	0.1	41.2	3.8	0.0	5.4	0.0	0.0	0.0
1993	2,593	0.2	4.3	3.2	11.0	15.6	0.7	0.0	55.5	4.9	0.2	4.9	0.0	0.0	0.0
1994	2,789	1.0	5.1	5.2	9.4	17.3	0.1	0.0	55.2	4.0	0.1	3.0	0.0	0.0	0.0
1995	3,461	0.3	14.6	3.0	4.0	32.9	0.1	0.1	36.3	5.8	0.1	3.0	0.0	0.0	0.0
1996	2,659	0.1	3.8	1.3	18.3	17.1	0.1	0.0	51.1	5.9	0.2	2.1	0.0	0.0	0.0
1997	2,787	0.1	1.4	1.8	9.4	27.4	0.2	0.2	44.5	7.3	0.1	7.6	0.1	0.0	0.0
1998	2,429	0.1	2.4	5.2	0.8	19.7	0.3	0.0	60.4	6.9	0.2	4.0	0.0	0.0	0.1
1999	2,261	0.9	4.8	6.5	2.5	39.9	1.1	0.0	30.3	12.1	0.1	1.7	0.0	0.0	0.0
2000	2,305	0.0	6.3	1.2	8.6	34.5	0.2	0.0	42.3	4.6	0.1	2.0	0.0	0.0	0.0
2001	2,145	0.5	2.2	8.3	9.7	21.4	0.3	0.0	53.8	2.1	0.1	1.4	0.0	0.0	0.0
2002	2,460	0.3	8.9	2.8	2.6	37.1	0.0	0.2	43.9	2.0	0.4	1.7	0.0	0.0	0.0
2003	1,982	0.4	6.8	3.5	7.6	24.9	0.1	0.1	54.4	1.1	0.2	1.2	0.0	0.0	0.0
Average(83-02)	2,721	0.3	4.8	3.5	7.9	24.6	0.4	0.1	48.8	5.5	0.2	4.1	0.0	0.0	0.0
SD(83-02)		0.3	3.3	2.1	4.2	7.9	0.5	0.1	8.9	2.6	0.1	2.0	0.0	0.0	0.0
CV(83-02)		91.7%	69.2%	61.1%	53.6%	32.0%	115.5%	138.1%	18.3%	48.3%	69.6%	47.9%	-	-	-

Table 6 (cont'd). Historical age composition of sockeye salmon passing Canyon Island, Taku River, 1983 to 2003.

	Sample	Percent By Age Class													
Year	Size	0.1	Year	Size	0.1	Year	Size	0.1	Year	Size	0.1	Year	Size	0.1	Year
Average(83-98)	2,828	0.3	4.6	3.2	8.4	22.5	0.4	0.1	50.3	5.6	0.2	4.7	0.0	0.0	0.0
Average(83-99)	2,795	0.3	4.6	3.4	8.1	23.5	0.5	0.1	49.1	5.9	0.2	4.5	0.0	0.0	0.0
Average(83-00)	2,768	0.3	4.7	3.3	8.1	24.1	0.4	0.1	48.8	5.9	0.2	4.4	0.0	0.0	0.0
Average(83-01)	2,735	0.3	4.6	3.5	8.2	24.0	0.4	0.1	49.0	5.7	0.2	4.2	0.0	0.0	0.0

Table 7. Migratory timing statistics of sockeye, pink, and chum salmon past the Canyon Island fish wheels, 1984 to 2003. Timing statistics in 1984 were based on catch; all other years were based on fish wheel CPUE.

	Species					
	Sockeye		Pink		Chum	
Year	Mean Date	S.D.	Mean Date	S.D.	Mean Date	S.D.
1984	7/23	17.6	7/19	9.3	8/14	12.8
1985	7/24	18.1	7/19	8.5	9/8	11.8
1986	7/16	14.2	7/27	5.5	8/7	11.3
1987	7/24	15.8	7/19	9.3	9/8	10.5
1988	7/19	19.5	7/21	9.6	8/31	12.5
1989	7/14	20.1	7/18	7.8	9/13	15.9
1990	7/20	18.8	7/23	8.9	8/30	15.1
1991	7/24	20.6	7/23	6.6	9/11	13.0
1992	7/25	14.4	7/24	7.2	8/28	13.5
1993	7/21	16.9	7/15	8.9	9/7	14.4
1994	7/23	20.2	7/24	10.1	9/2	15.6
1995	7/22	22.0	7/14	7.8	9/3	9.8
1996	7/21	18.9	7/23	6.5	8/27	14.0
1997	7/26	23.9	7/14	10.0	9/5	11.6
1998	7/18	21.1	7/24	7.9	9/4	8.7
1999	7/18	19.5	7/24	7.9	9/3	14.5
2000	7/17	20.8	7/25	8.7	8/30	16.9
2001	7/20	18.1	7/18	8.4	9/2	13.4
2002	7/9	18.6	7/20	7.6	8/31	12.3
2003	7/18	16.2	7/14	7.7	9/7	13.6
Average(84-02)	7/20	18.9	7/20	8.2	8/31	13.1
Average(84-97)	7/21	18.6	7/20	8.3	8/31	13.0
Average(84-98)	7/21	18.8	7/20	8.3	8/31	12.7
Average(84-99)	7/21	18.9	7/20	8.2	8/31	12.8
Average(84-00)	7/20	19.0	7/20	8.3	8/31	13.1
Average(84-01)	7/20	18.9	7/20	8.3	8/31	13.1

Table 8. Weekly and cumulative proportions of three individual sockeye salmon stocks passing Canyon Island in 2003, based on spawning ground tag recoveries expanded by fish wheel indices (fish wheel CPUE).

			Kuthai Lake		Little Trapper Lake		Tatsamenie Lake	
Statistical Week	Week Starting	Week Ending	Weekly Proportion	Cum. Proportion	Weekly Proportion	Cum. Proportion	Weekly Proportion	Cum. Proportion
22	25-May	31-May						
23	1-Jun	7-Jun	0%	0%				
24	8-Jun	14-Jun	3%	3%				
25	15-Jun	21-Jun	13%	16%	0%	0%		
26	22-Jun	28-Jun	16%	32%	1%	1%		
27	29-Jun	5-Jul	41%	73%	11%	12%	0%	0%
28	6-Jul	12-Jul	14%	87%	24%	35%	2%	2%
29	13-Jul	19-Jul	13%	100%	41%	76%	8%	10%
30	20-Jul	26-Jul			14%	90%	15%	24%
31	27-Jul	2-Aug			6%	96%	20%	44%
32	3-Aug	9-Aug			3%	99%	27%	71%
33	10-Aug	16-Aug			1%	100%	17%	89%
34	17-Aug	23-Aug					8%	97%
35	24-Aug	30-Aug					0%	97%
36	31-Aug	6-Sep					3%	100%
37	7-Sep	13-Sep						

Table 9. Inriver migration timing for three Taku River sockeye salmon stocks, 2003.

Stock	Week	Travel Time	SD	SE	N	95% C.I.
Tatsamenie	26					
	27					
	28	46.5	4.9	3.5	2	6.86
	29	37.7	5.5	2.1	7	4.07
	30	36.4	5.3	1.5	12	2.98
	31	34.9	9.3	2.3	16	4.57
	32	32.8	6.9	1.4	23	2.81
	33	28.1	8.0	3.0	7	5.90
	34	28.8	5.4	2.7	4	5.27
	35					
	36	19.0	2.8	2.0	2	3.92
	Average	33.7	8.0			
L. Trapper	25	39.0			1	
	26	36.6	1.9	0.7	7	1.41
	27	31.4	2.4	0.3	63	0.59
	28	27.6	3.1	0.3	123	0.56
	29	24.5	4.4	0.3	209	0.60
	30	21.9	3.7	0.4	75	0.84
	31	21.3	4.6	0.7	44	1.36
	32	22.4	3.6	0.6	37	1.17
	33	18.8	2.5	1.3	4	
	Average	25.4	5.1			
Kuthai	23					
	24	38.3	1.2	0.7	3	1.3
	25	34.6	5.1	1.5	12	2.9
	26	29.5	5.0	1.4	13	2.7
	27	26.9	5.9	1.0	35	1.9
	28	25.2	7.1	2.0	12	4.0
	29	23.3	4.9	1.5	11	2.9
	30					
	Average	28.4	6.7			

[a] The average travel time for each weekly period was derived from the number of days the tagged fish took to travel between the tagging site (Canyon Island) and the recovery location (weir site).

Table 10. Historical length (MEF) at age composition of sockeye salmon passing Canyon Island, Taku River, 1983 to 2003.

	Sample	Length At Age Class													
Year	Size	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	3.2	3.3
1983	1,573		447		577	469			578	522	618	582			
1984	1,572	297	445	315	575	476	320	610	576	511	580	589			
1985	2,422	309	457	337	572	486	372	609	579	510	597	590	625		
1986	3,362		449	305	584	493	310		582	491	598	581			
1987	2,923	316	460	319	587	463	329	610	592	494	565	592	650		
1988	2,422	313	443	319	576	482	324		578	480	600	578			
1989	4,254	315	442	340	578	468	334		591	488	619	589			
1990	4,432	316	427	326	570	470	322	612	574	485	578	576	555		
1991	3,581	313	442	322	561	463	321	610	569	482	602	572			
1992	1,667	351	431	328	564	467	345	585	568	482		569			
1993	2,582	316	440	327	555	470	333		558	507	573	556			
1994	2,784	329	431	327	559	455	325		557	497	585	561			
1995	3,435	324	455	329	563	481	357	625	562	509	630	569			
1996	2,649	300	472	323	581	489	338		583	524	607	587			
1997	2,770	310	461	332	579	503	339	581	580	514	585	574		490	
1998	2,427	313	445	327	578	483	346		569	510	579	575			555
1999	2,251	328	446	317	565	485	326	555	568	515	612	575		540	
2000	2,300	310	460	324	583	503	329		582	508	610	581			
2001	2,140	308	449	324	581	498	340	600	586	519	572	567			
2002	2,453	299	437	334	583	473	320	614	589	522	609	595			
2003	1,966	336	458	340	570	475	340	570	578	492	582	593			
Average(83-02)	2,665	315	447	325	574	479	333	601	576	504	596	578	610	515	555
SD(83-02)		12.6	11.4	8.1	9.4	13.7	14.7	19.9	10.3	14.8	18.5	10.6	49.2	35.4	
CV(83-02)		4.0%	2.5%	2.5%	1.6%	2.9%	4.4%	3.3%	1.8%	2.9%	3.1%	1.8%	8.1%	6.9%	

Table 10 (cont'd). Historical length (MEF) at age composition of sockeye salmon passing Canyon Island, Taku River, 1983 to 2003.

Year	Sample Size	Length At Age Class													
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	3.2	3.3
Average(83-98)	2,803	316	447	325	572	476	334	605	575	500	594	578	610	490	555
Average(83-99)	2,771	317	447	325	572	477	334	600	574	501	596	577	610	515	555
Average(83-00)	2,745	316	447	325	573	478	334	600	575	502	596	578	610	515	555
Average(83-01)	2,713	316	447	325	573	479	334	600	575	503	595	577	610	515	555

Table 11. Historical age composition of chum salmon passing Canyon Island, Taku River, 1983 to 2003.

Year	Sample Size	Percent by Age Class 0.2	0.3	0.4	0.5	0.6
1983	24	8.3	45.8	54.2	8.3	0.0
1984	280	2.5	85.0	13.6	0.0	0.0
1985	728	0.4	68.1	31.9	0.0	0.0
1986	64	0.0	51.6	51.6	0.0	0.0
1987	1075	1.0	48.6	48.8	2.0	0.0
1988	853	0.0	30.4	68.5	1.5	0.0
1989	574	0.5	77.4	19.5	3.1	0.3
1990	636	0.3	23.0	76.7	0.5	0.3
1991	missing data					
1992	163	0.0	56.4	37.4	8.0	0.0
1993	278	0.7	22.3	75.9	2.5	0.0
1994	310	0.6	32.6	63.2	4.8	0.0
1995	192	2.1	19.8	75.5	4.7	0.0
1996	351	1.1	68.4	23.4	7.1	0.0
1997	425	0.9	56.2	42.4	0.5	0.0
1998	152	0.7	27.6	67.8	3.9	0.0
1999	151	2.0	84.1	13.9	0.0	0.0
2000	273	0.0	75.5	24.5	0.0	0.0
2001	207	1.0	44.9	54.1	0.0	0.0
2002	144	0.7	45.8	53.5	0.0	0.0
2003	230	2.7	72.9	23.1	1.3	0.0
Average (83-02)	362	1.2	50.7	47.2	2.5	0.0
SD (83-02)		1.9	21.3	21.4	2.9	0.1
Average (83-98)	407	1.3	47.5	50.0	3.1	0.0
Average (83-99)	391	1.3	49.8	47.8	2.9	0.0
Average (83-00)	384	1.2	51.3	46.4	2.8	0.0
Average (83-01)	374	1.2	51.0	46.8	2.6	0.0

Table 12. Historical length (MEF) at age composition of chum salmon passing Canyon Island, Taku River, 1983 to 2002.

Year	Sample Size	Length at Age Class 0.2	0.3	0.4	0.5	0.6
1983	24	599	651	658	714	
1984	279	615	630	683		
1985	727	592	658	680		
1986	63		640	666		
1987	1,061	579	642	668	668	
1988	845		642	675	690	
1989	571	587	628	669	678	680
1990	634	655	629	666	690	600
1991	missing data					
1992	163		614	656	667	
1993	277	510	598	638	616	
1994	310	660	610	645	660	
1995	192	556	632	652	663	
1996	350	595	642	662	684	
1997	424	651	640	673	693	
1998	151	600	634	662	703	
1999	149	615	644	664		
2000	273		650	680		
2001	207	528	623	665		
2002	144	610	649	669		
2003	227	564	612	644	650	
Average (83-02)	360	597	635	665	677	640
SD (83-02)		43	15	12	25	57
Average (83-98)	405	600	633	664	677	640
Average (83-99)	389	601	633	664	677	640
Average (83-00)	382	601	634	665	677	640
Average (83-01)	372	596	634	665	677	640

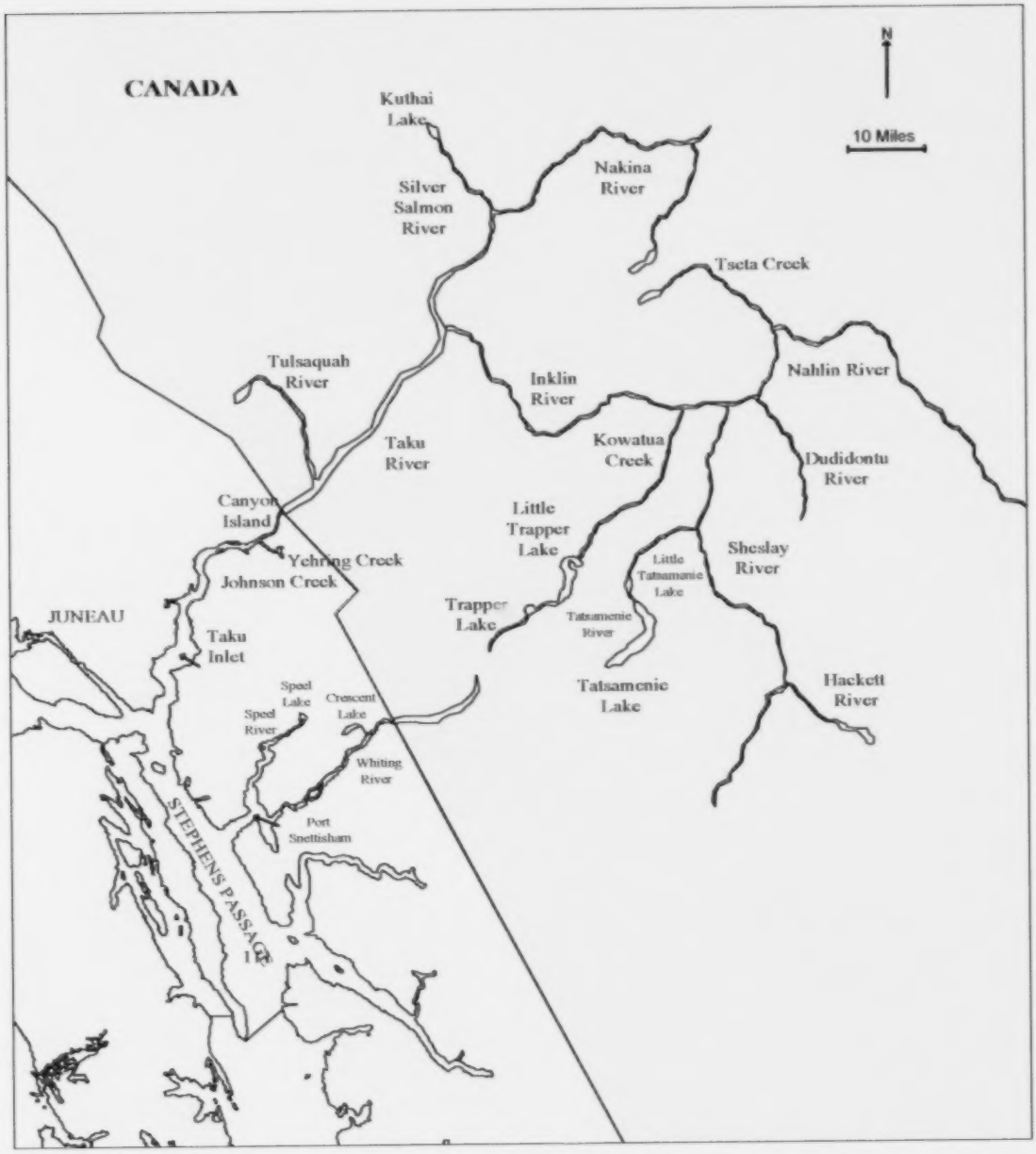


Figure 1. Taku River drainage, with location of tagging and recovery sites.

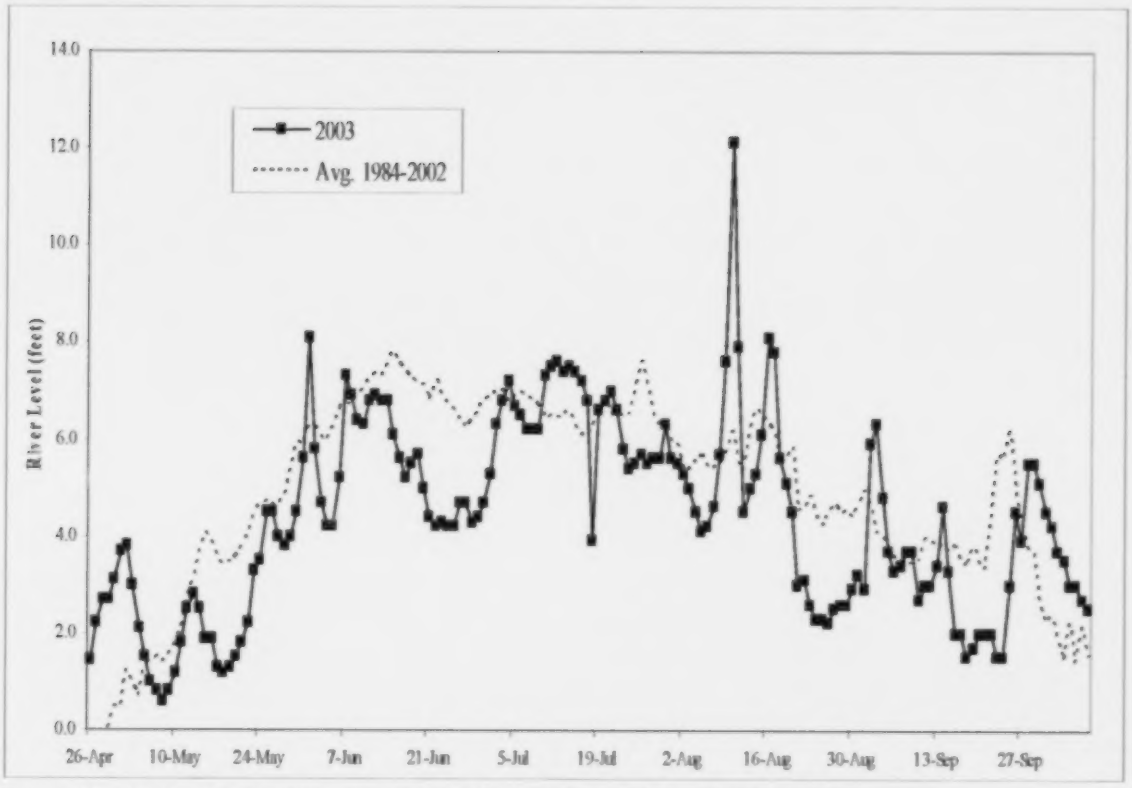


Figure 2. Water levels at Canyon Island, Taku River, 2003 vs. 1986-2002 average.

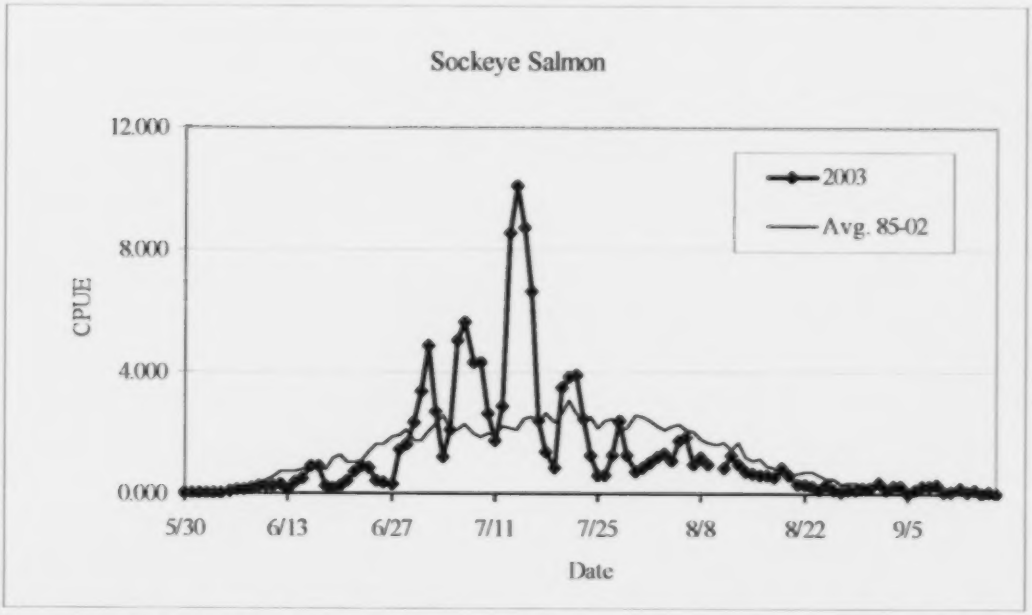
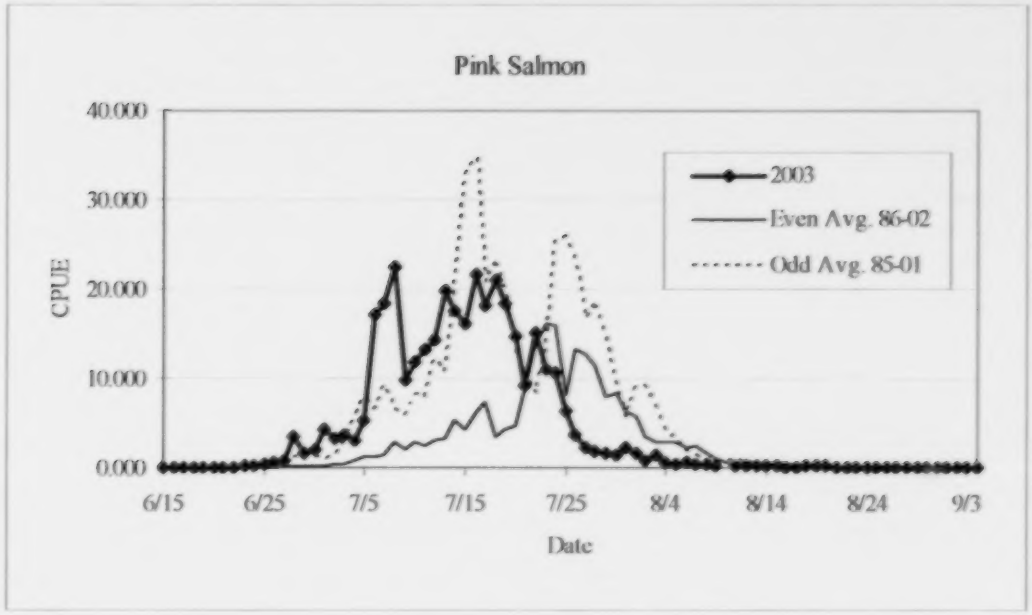


Figure 3. Fish wheel CPUE for sockeye, pink and chum salmon at Canyon Island, Taku River, 2003.



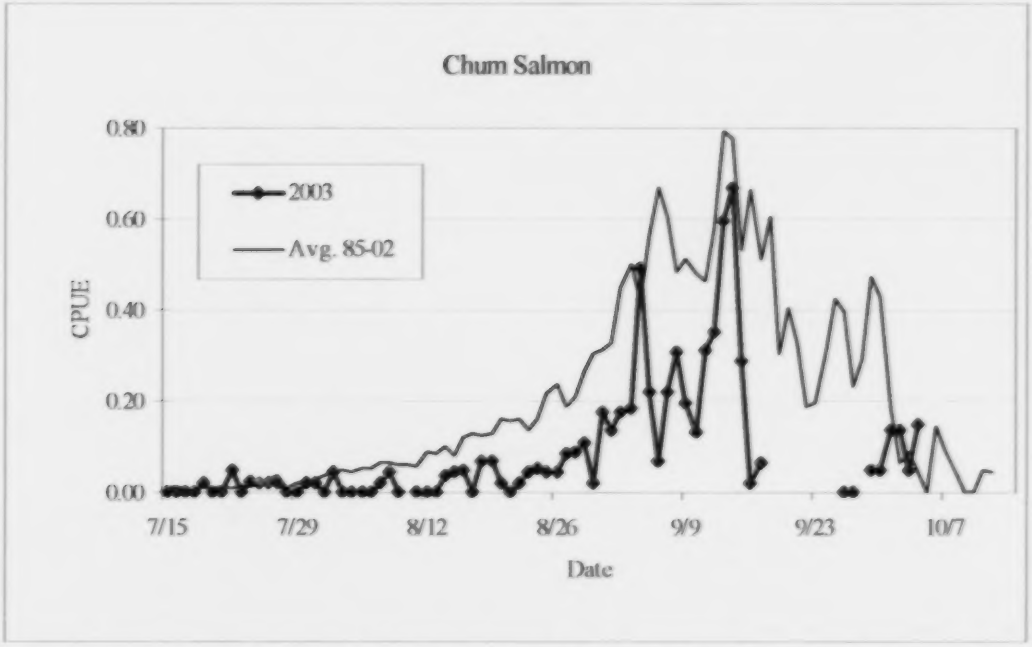


Figure 3 (cont'd). Fish wheel CPUE for sockeye, pink and chum salmon at Canyon Island, Taku River, 2003.

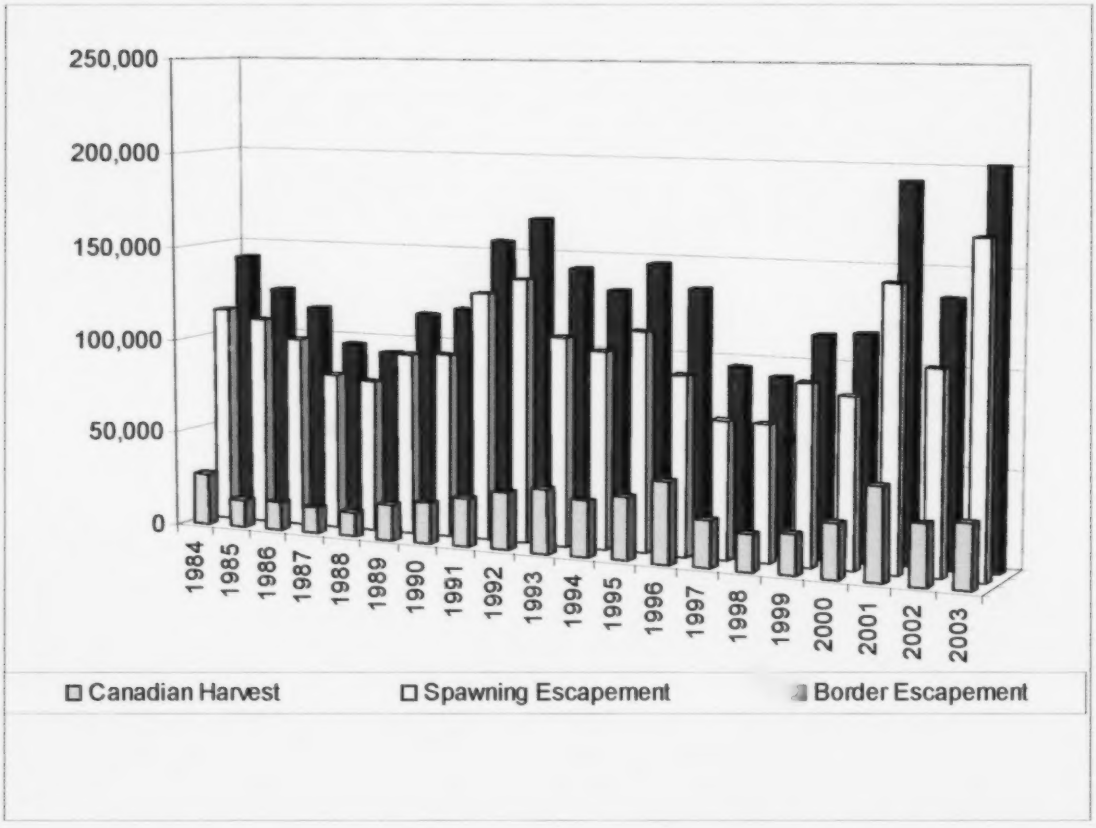


Figure 4. Historical sockeye mark-recapture abundance estimates above the U.S./Canada border including Canadian inriver harvests and escapements for Taku River sockeye, 1984-2003.

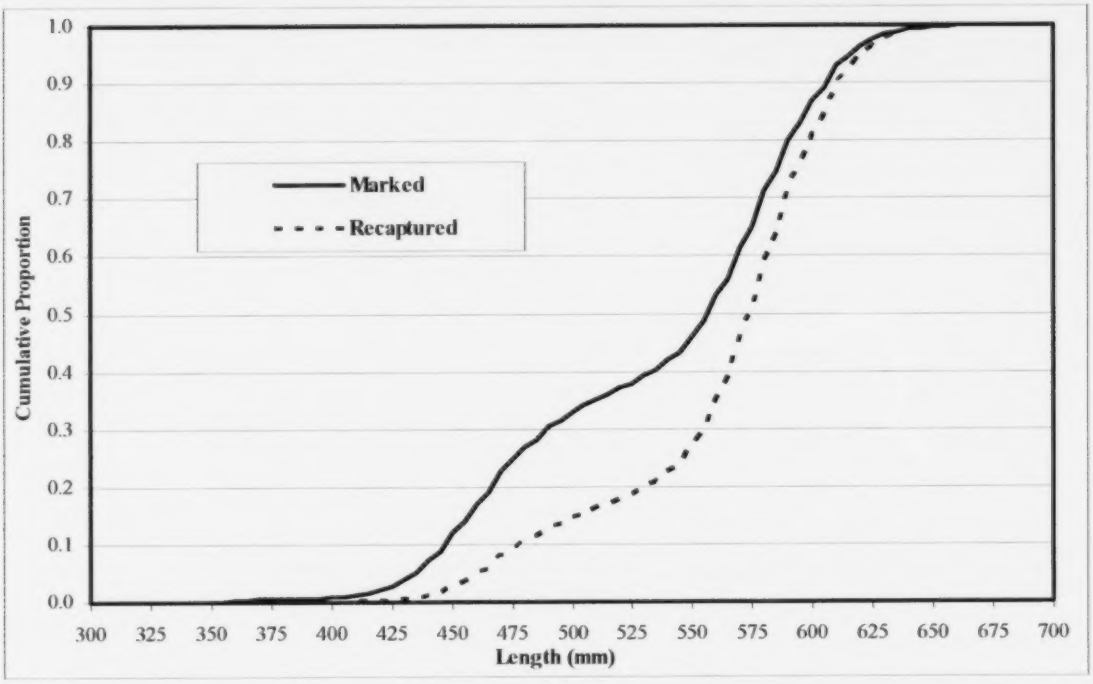


Figure 5. Cumulative Distribution Functions (CDF) of MEF lengths of sockeye salmon tagged at Canyon Island and of tagged sockeye salmon recovered in the Canadian commercial fishery, 2003.

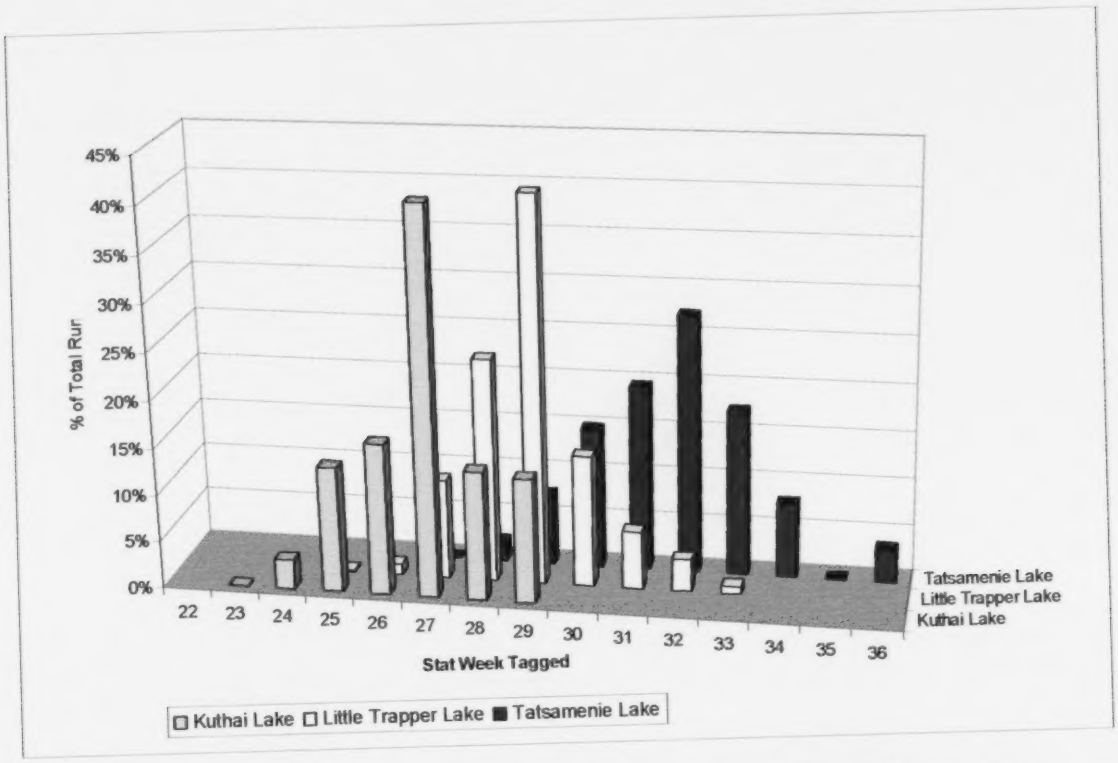


Figure 6. Run timing of three sockeye salmon stock groups passing Canyon Island, 2003.

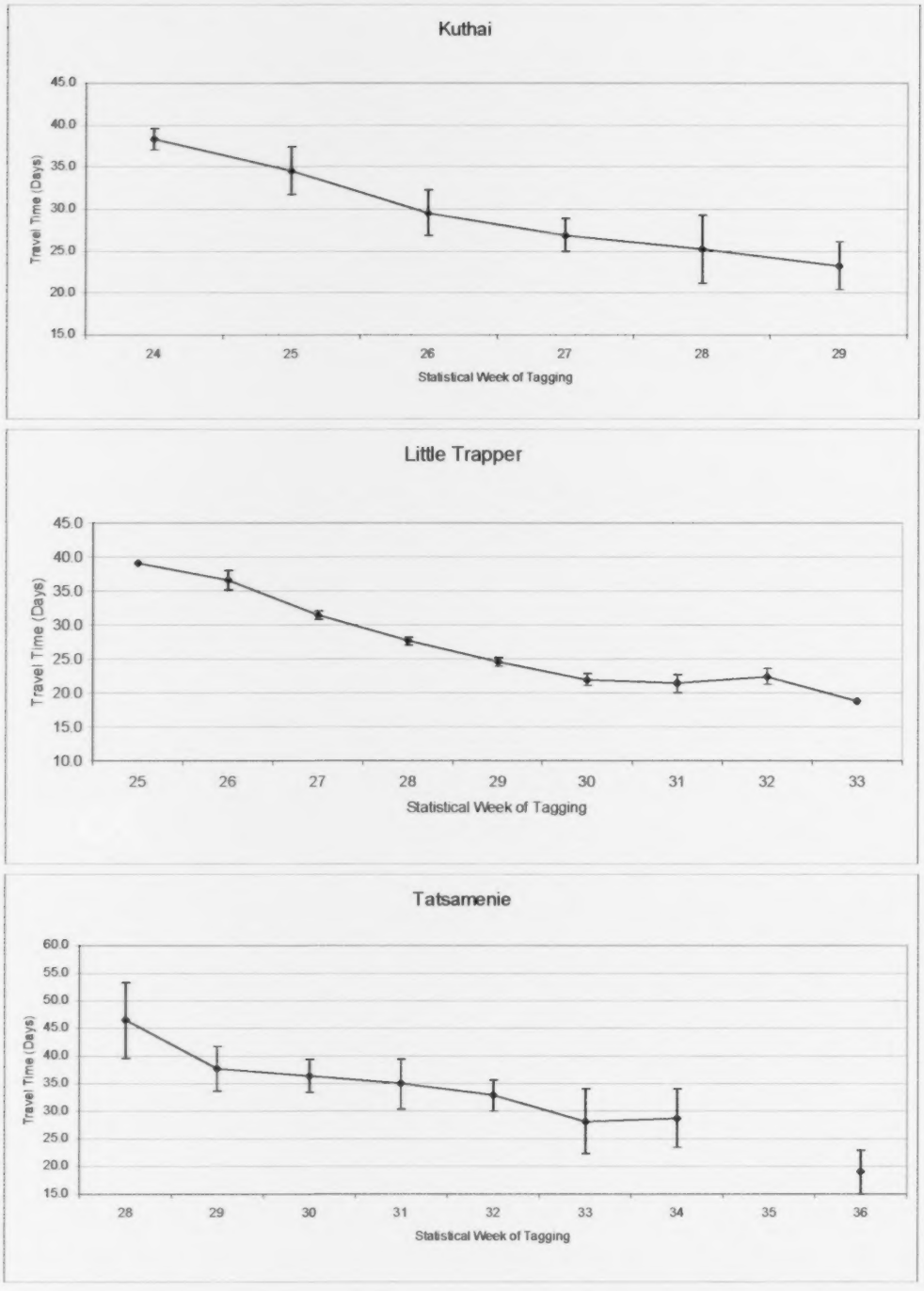


Figure 7. Mean travel times (and 95% confidence intervals) for tagged sockeye salmon between Canyon Island and three upriver locations, 2003.

Appendix A1. Inclusive dates for statistical weeks, 2003.

Week	From	To	Week	From	To
1	1-Jan	4-Jan	28	6-Jul	12-Jul
2	5-Jan	11-Jan	29	13-Jul	19-Jul
3	12-Jan	18-Jan	30	20-Jul	26-Jul
4	19-Jan	25-Jan	31	27-Jul	2-Aug
5	26-Jan	1-Feb	32	3-Aug	9-Aug
6	2-Feb	8-Feb	33	10-Aug	16-Aug
7	9-Feb	15-Feb	34	17-Aug	23-Aug
8	16-Feb	22-Feb	35	24-Aug	30-Aug
9	23-Feb	1-Mar	36	31-Aug	6-Sep
10	2-Mar	8-Mar	37	7-Sep	13-Sep
11	9-Mar	15-Mar	38	14-Sep	20-Sep
12	16-Mar	22-Mar	39	21-Sep	27-Sep
13	23-Mar	29-Mar	40	28-Sep	4-Oct
14	30-Mar	5-Apr	41	5-Oct	11-Oct
15	6-Apr	12-Apr	42	12-Oct	18-Oct
16	13-Apr	19-Apr	43	19-Oct	25-Oct
17	20-Apr	26-Apr	44	26-Oct	1-Nov
18	27-Apr	3-May	45	2-Nov	8-Nov
19	4-May	10-May	46	9-Nov	15-Nov
20	11-May	17-May	47	16-Nov	22-Nov
21	18-May	24-May	48	23-Nov	29-Nov
22	25-May	31-May	49	30-Nov	6-Dec
23	1-Jun	7-Jun	50	7-Dec	13-Dec
24	8-Jun	14-Jun	51	14-Dec	20-Dec
25	15-Jun	21-Jun	52	21-Dec	27-Dec
26	22-Jun	28-Jun	53	28-Dec	3-Jan
27	29-Jun	5-Jul			

Appendix B.1. Catches, number tagged, and CPUE of sockeye salmon in the fishwheels at Canyon Island, 2003.

Stat Week	Date	FISHING EFFORT (hours) FW I	FW II	Total	SOCKEYE Catch Daily	Cum.	Tagged Daily	Cum.	CPUE Daily	Cum. Prop.
21	20-May		12.67	12.67	0	0	0	0	0.0	0.0%
21	21-May		23.92	23.92	0	0	0	0	0.0	0.0%
21	22-May		23.59	23.59	0	0	0	0	0.0	0.0%
21	23-May		19.07	19.07	0	0	0	0	0.0	0.0%
21	24-May		23.30	23.30	0	0	0	0	0.0	0.0%
22	25-May		22.80	22.80	0	0	0	0	0.0	0.0%
22	26-May		23.59	23.59	0	0	0	0	0.0	0.0%
22	27-May		23.30	23.30	0	0	0	0	0.0	0.0%
22	28-May		23.15	23.15	0	0	0	0	0.0	0.0%
22	29-May		23.04	23.04	0	0	0	0	0.0	0.0%
22	30-May		23.45	23.45	0	0	0	0	0.0	0.0%
22	31-May		23.32	23.32	0	0	0	0	0.0	0.0%
23	1-Jun		23.79	23.79	0	0	0	0	0.0	0.0%
23	2-Jun		23.59	23.59	0	0	0	0	0.0	0.0%
23	3-Jun		23.42	23.42	0	0	0	0	0.0	0.0%
23	4-Jun		22.77	22.77	0	0	0	0	0.0	0.0%
23	5-Jun		23.09	23.09	2	2	2	2	0.1	0.1%
23	6-Jun	4.00	22.92	26.92	4	6	3	5	0.1	0.2%
23	7-Jun	22.90	23.39	46.29	6	12	6	11	0.1	0.3%
24	8-Jun	22.99	23.05	46.04	7	19	7	18	0.2	0.4%
24	9-Jun	22.87	22.57	45.44	10	29	8	26	0.2	0.5%
24	10-Jun	22.87	23.50	46.37	10	39	10	36	0.2	0.7%
24	11-Jun	23.47	23.19	46.66	11	50	9	45	0.2	0.9%
24	12-Jun	21.09	23.22	44.31	14	64	14	59	0.3	1.1%
24	13-Jun	23.64	23.70	47.34	5	69	5	64	0.1	1.2%
24	14-Jun	23.40	23.48	46.88	18	87	18	82	0.4	1.4%
25	15-Jun	22.60	22.29	44.89	22	109	21	103	0.5	1.8%
25	16-Jun	22.87	22.70	45.57	41	150	36	139	0.9	2.4%
25	17-Jun	23.02	22.87	45.89	41	191	35	174	0.9	3.1%
25	18-Jun	23.32	23.30	46.62	12	203	12	186	0.3	3.3%
25	19-Jun	23.67	23.52	47.19	9	212	8	194	0.2	3.4%
25	20-Jun	23.62	23.42	47.04	10	222	9	203	0.2	3.5%
25	21-Jun	22.44	22.97	45.41	18	240	17	220	0.4	3.8%
26	22-Jun	23.14	22.97	46.11	32	272	26	246	0.7	4.3%
26	23-Jun	23.27	23.15	46.42	42	314	41	287	0.9	5.0%
26	24-Jun	23.19	23.27	46.46	38	352	37	324	0.8	5.6%
26	25-Jun	23.09	22.92	46.01	18	370	18	342	0.4	5.8%
26	26-Jun	23.10	23.55	46.65	16	386	16	358	0.3	6.1%
26	27-Jun	22.97	23.38	46.35	13	399	13	371	0.3	6.3%
26	28-Jun	23.00	22.58	45.58	65	464	63	434	1.4	7.3%
27	29-Jun	22.80	21.90	44.70	73	537	67	501	1.6	8.5%
27	30-Jun	22.37	22.17	44.54	104	641	94	595	2.3	10.2%
27	1-Jul	22.10	21.90	44.00	148	789	143	738	3.4	12.6%
27	2-Jul	21.55	20.82	42.37	205	994	194	932	4.8	16.0%

Stat Week	Date	FISHING EFFORT (hours) FW I	FW II	Total	SOCKEYE Catch Daily	Cum.	Tagged Daily	Cum.	CPUE Daily	Cum. Prop.
27	3-Jul	22.39	21.89	44.28	120	1,114	113	1,045	2.7	18.0%
27	4-Jul	23.03	22.72	45.75	55	1,169	54	1,099	1.2	18.8%
27	5-Jul	22.82	22.37	45.19	95	1,264	88	1,187	2.1	20.4%
28	6-Jul	21.95	19.30	41.25	207	1,471	187	1,374	5.0	23.9%
28	7-Jul	21.80	21.25	43.05	241	1,712	232	1,606	5.6	28.0%
28	8-Jul	22.22	21.42	43.64	188	1,900	174	1,780	4.3	31.1%
28	9-Jul	21.82	21.02	42.84	185	2,085	175	1,955	4.3	34.2%
28	10-Jul	22.69	22.32	45.01	117	2,202	112	2,067	2.6	36.0%
28	11-Jul	22.57	22.38	44.95	77	2,279	73	2,140	1.7	37.2%
28	12-Jul	22.29	22.25	44.54	127	2,406	117	2,257	2.9	39.3%
29	13-Jul	21.75	18.95	40.70	348	2,754	332	2,589	8.6	45.4%
29	14-Jul	21.90	19.67	41.57	420	3,174	398	2,987	10.1	52.7%
29	15-Jul	21.67	19.8	41.50	362	3,536	341	3,328	8.7	58.9%
29	16-Jul	21.50	20.41	41.91	278	3,814	253	3,581	6.6	63.7%
29	17-Jul	21.75	22.62	44.37	105	3,919	95	3,676	2.4	65.4%
29	18-Jul	22.58	22.83	45.41	63	3,982	53	3,729	1.4	66.4%
29	19-Jul	22.41	23.33	45.74	39	4,021	34	3,763	0.9	67.0%
30	20-Jul	22.66	22.41	45.07	157	4,178	137	3,900	3.5	69.5%
30	21-Jul	22.41	22.50	44.91	171	4,349	154	4,054	3.8	72.2%
30	22-Jul	20.42	22.38	42.80	167	4,516	157	4,211	3.9	75.0%
30	23-Jul	21.40	22.80	44.20	109	4,625	99	4,310	2.5	76.8%
30	24-Jul	22.25	22.68	44.93	57	4,682	50	4,360	1.3	77.7%
30	25-Jul	23.33	23.41	46.74	27	4,709	24	4,384	0.6	78.1%
30	26-Jul	23.35	23.49	46.84	27	4,736	23	4,407	0.6	78.5%
31	27-Jul	23.00	22.97	45.97	59	4,795	53	4,460	1.3	79.4%
31	28-Jul	22.75	23.00	45.75	108	4,903	99	4,559	2.4	81.1%
31	29-Jul	22.32	23.52	45.84	58	4,961	54	4,613	1.3	82.0%
31	30-Jul	23.25	23.65	46.90	35	4,996	31	4,644	0.7	82.6%
31	31-Jul	23.08	23.50	46.58	39	5,035	33	4,677	0.8	83.2%
31	1-Aug	23.15	23.40	46.55	48	5,083	42	4,719	1.0	83.9%
31	2-Aug	23.16	23.50	46.66	56	5,139	44	4,763	1.2	84.8%
32	3-Aug	22.48	23.07	45.55	61	5,200	55	4,818	1.3	85.7%
32	4-Aug	23.18	23.38	46.56	51	5,251	45	4,863	1.1	86.5%
32	5-Aug	22.80	23.23	46.03	79	5,330	68	4,931	1.7	87.7%
32	6-Aug	23.10	23.07	46.17	86	5,416	78	5,009	1.9	89.1%
32	7-Aug	23.50	23.35	46.85	44	5,460	39	5,048	0.9	89.8%
32	8-Aug	22.20	22.12	44.32	54	5,514	48	5,096	1.2	90.6%
32	9-Aug	20.98	20.47	41.45	39	5,553	35	5,131	0.9	91.3%
33	10-Aug			0.00		5,553		5,131		91.3%
33	11-Aug	8.50		8.50	7	5,560	0	5,131	0.8	91.9%
33	12-Aug	10.52		10.52	13	5,573	9	5,140	1.2	92.8%
33	13-Aug	23.00		23.00	22	5,595	19	5,159	1.0	93.5%
33	14-Aug	23.20	4.22	27.42	20	5,615	16	5,175	0.7	94.0%
33	15-Aug	21.80	22.60	44.40	29	5,644	25	5,200	0.7	94.5%
33	16-Aug	20.10	21.20	41.30	24	5,668	24	5,224	0.6	94.9%
34	17-Aug	13.40	14.28	27.68	16	5,684	15	5,239	0.6	95.3%
34	19-Aug	22.60	22.70	45.30	38	5,746	28	5,288	0.8	96.3%

Stat Week	Date	FISHING EFFORT (hours)			SOCKEYE					
					Catch		Tagged		CPUE	
		FW I	FW II	Total	Daily	Cum.	Daily	Cum.	Daily	Cum. Prop.
34	20-Aug	23.16	23.00	46.16	28	5,774	22	5,310	0.6	96.7%
34	21-Aug	23.33	23.20	46.53	13	5,787	9	5,319	0.3	96.9%
34	22-Aug	23.38	23.35	46.73	15	5,802	11	5,330	0.3	97.1%
34	23-Aug	23.30	23.48	46.78	12	5,814	9	5,339	0.3	97.3%
35	24-Aug	23.62	14.25	37.87	4	5,818	1	5,340	0.1	97.4%
35	25-Aug	23.73		23.73	7	5,825	6	5,346	0.3	97.6%
35	26-Aug	23.63		23.63	3	5,828	2	5,348	0.1	97.7%
35	27-Aug	23.67		23.67	2	5,830	2	5,350	0.1	97.8%
35	28-Aug	23.27	10.87	34.14	5	5,835	2	5,352	0.1	97.9%
35	29-Aug	23.30	23.30	46.60	6	5,841	5	5,357	0.1	98.0%
35	30-Aug	23.00	23.20	46.20	7	5,848	6	5,363	0.2	98.1%
36	31-Aug	23.00	22.80	45.80	9	5,857	8	5,371	0.2	98.2%
36	1-Sep	22.40	22.30	44.70	16	5,873	15	5,386	0.4	98.5%
36	2-Sep	22.30	23.50	45.80	5	5,878	5	5,391	0.1	98.5%
36	3-Sep	20.80	22.90	43.70	10	5,888	8	5,399	0.2	98.7%
36	4-Sep	20.10	22.60	42.70	10	5,898	10	5,409	0.2	98.9%
36	5-Sep	22.50	22.80	45.30	1	5,899	1	5,410	0.0	98.9%
36	6-Sep	21.20	23.30	44.50	6	5,905	3	5,413	0.1	99.0%
37	7-Sep	22.60	22.80	45.40	11	5,916	11	5,424	0.2	99.2%
37	8-Sep	22.70	22.50	45.20	10	5,926	8	5,432	0.2	99.3%
37	9-Sep	22.90	22.70	45.60	13	5,939	10	5,442	0.3	99.5%
37	10-Sep	22.80	22.80	45.60	3	5,942	3	5,445	0.1	99.6%
37	11-Sep	22.60	22.40	45.00	3	5,945	0	5,445	0.1	99.6%
37	12-Sep	23.30	22.30	45.60	9	5,954	6	5,451	0.2	99.8%
37	13-Sep	23.80	21.50	45.30	4	5,958	3	5,454	0.1	99.8%
38	14-Sep	22.00	22.80	44.80	5	5,963	4	5,458	0.1	99.9%
38	15-Sep	22.30	23.10	45.40	1	5,964	1	5,459	0.0	99.9%
38	16-Sep	22.50	23.60	46.10	4	5,968	3	5,462	0.1	100.0%
38	17-Sep	22.20	23.90	46.10	1	5,969	1	5,463	0.0	100.0%

Appendix B.2. Catches and CPUE of pink and chum salmon in the fishwheels at Canyon Island, 2003.

		FISHING EFFORT (hours)			PINK				CHUM			
					Catch		CPUE		Catch		CPUE	
Stat Week	Date	FW I	FW II	Total	Daily	Cum.	Daily	Cum. Prop.	Daily	Cum.	Daily	Cum. Prop.
21	20-May		12.67	12.67	0	0	0.00	0.0%	0	0	0.00	0.0%
21	21-May		23.92	23.92	0	0	0.00	0.0%	0	0	0.00	0.0%
21	22-May		23.59	23.59	0	0	0.00	0.0%	0	0	0.00	0.0%
21	23-May		19.07	19.07	0	0	0.00	0.0%	0	0	0.00	0.0%
21	24-May		23.30	23.30	0	0	0.00	0.0%	0	0	0.00	0.0%
22	25-May		22.80	22.80	0	0	0.00	0.0%	0	0	0.00	0.0%
22	26-May		23.59	23.59	0	0	0.00	0.0%	0	0	0.00	0.0%
22	27-May		23.30	23.30	0	0	0.00	0.0%	0	0	0.00	0.0%
22	28-May		23.15	23.15	0	0	0.00	0.0%	0	0	0.00	0.0%
22	29-May		23.04	23.04	0	0	0.00	0.0%	0	0	0.00	0.0%
22	30-May		23.45	23.45	0	0	0.00	0.0%	0	0	0.00	0.0%
22	31-May		23.32	23.32	0	0	0.00	0.0%	0	0	0.00	0.0%
23	1-Jun		23.79	23.79	0	0	0.00	0.0%	0	0	0.00	0.0%
23	2-Jun		23.59	23.59	0	0	0.00	0.0%	0	0	0.00	0.0%
23	3-Jun		23.42	23.42	0	0	0.00	0.0%	0	0	0.00	0.0%
23	4-Jun		22.77	22.77	0	0	0.00	0.0%	0	0	0.00	0.0%
23	5-Jun		23.09	23.09	0	0	0.00	0.0%	0	0	0.00	0.0%
23	6-Jun	4.00	22.92	26.92	0	0	0.00	0.0%	0	0	0.00	0.0%
23	7-Jun	22.90	23.39	46.29	0	0	0.00	0.0%	0	0	0.00	0.0%
24	8-Jun	22.99	23.05	46.04	0	0	0.00	0.0%	0	0	0.00	0.0%
24	9-Jun	22.87	22.57	45.44	0	0	0.00	0.0%	0	0	0.00	0.0%
24	10-Jun	22.87	23.50	46.37	0	0	0.00	0.0%	0	0	0.00	0.0%
24	11-Jun	23.47	23.19	46.66	0	0	0.00	0.0%	0	0	0.00	0.0%
24	12-Jun	21.09	23.22	44.31	0	0	0.00	0.0%	0	0	0.00	0.0%
24	13-Jun	23.64	23.70	47.34	0	0	0.00	0.0%	0	0	0.00	0.0%
24	14-Jun	23.40	23.48	46.88	0	0	0.00	0.0%	0	0	0.00	0.0%
25	15-Jun	22.60	22.29	44.89	0	0	0.00	0.0%	0	0	0.00	0.0%
25	16-Jun	22.87	22.70	45.57	0	0	0.00	0.0%	0	0	0.00	0.0%
25	17-Jun	23.02	22.87	45.89	0	0	0.00	0.0%	0	0	0.00	0.0%
25	18-Jun	23.32	23.30	46.62	0	0	0.00	0.0%	0	0	0.00	0.0%
25	19-Jun	23.67	23.52	47.19	1	1	0.02	0.0%	0	0	0.00	0.0%
25	20-Jun	23.62	23.42	47.04	1	2	0.02	0.0%	0	0	0.00	0.0%
25	21-Jun	22.44	22.97	45.41	0	2	0.00	0.0%	0	0	0.00	0.0%
26	22-Jun	23.14	22.97	46.11	3	5	0.07	0.0%	0	0	0.00	0.0%
26	23-Jun	23.27	23.15	46.42	6	11	0.13	0.1%	0	0	0.00	0.0%
26	24-Jun	23.19	23.27	46.46	5	16	0.11	0.1%	0	0	0.00	0.0%
26	25-Jun	23.09	22.92	46.01	20	36	0.43	0.2%	0	0	0.00	0.0%

Stat Week	Date	FISHING EFFORT (hours)			PINK				CHUM			
					Catch		CPUE		Catch		CPUE	
		FW I	FW II	Total	Daily	Cum.	Daily	Cum. Prop.	Daily	Cum.	Daily	Cum. Prop.
26	26-Jun	23.10	23.55	46.65	27	63	0.58	0.4%	0	0	0.00	0.0%
26	27-Jun	22.97	23.38	46.35	34	97	0.73	0.6%	0	0	0.00	0.0%
26	28-Jun	23.00	22.58	45.58	157	254	3.44	1.6%	0	0	0.00	0.0%
27	29-Jun	22.80	21.90	44.70	75	329	1.68	2.0%	0	0	0.00	0.0%
27	30-Jun	22.37	22.17	44.54	88	417	1.98	2.6%	0	0	0.00	0.0%
27	1-Jul	22.10	21.90	44.00	189	606	4.30	3.8%	0	0	0.00	0.0%
27	2-Jul	21.55	20.82	42.37	140	746	3.30	4.7%	0	0	0.00	0.0%
27	3-Jul	22.39	21.89	44.28	165	911	3.73	5.8%	0	0	0.00	0.0%
27	4-Jul	23.03	22.72	45.75	136	1,047	2.97	6.6%	0	0	0.00	0.0%
27	5-Jul	22.82	22.37	45.19	239	1,286	5.29	8.1%	0	0	0.00	0.0%
28	6-Jul	21.95	19.30	41.25	705	1,991	17.09	12.9%	0	0	0.00	0.0%
28	7-Jul	21.80	21.25	43.05	793	2,784	18.42	18.0%	0	0	0.00	0.0%
28	8-Jul	22.22	21.42	43.64	983	3,767	22.53	24.3%	0	0	0.00	0.0%
28	9-Jul	21.82	21.02	42.84	418	4,185	9.76	27.1%	0	0	0.00	0.0%
28	10-Jul	22.69	22.32	45.01	529	4,714	11.75	30.4%	0	0	0.00	0.0%
28	11-Jul	22.57	22.38	44.95	598	5,312	13.30	34.1%	0	0	0.00	0.0%
28	12-Jul	22.29	22.25	44.54	637	5,949	14.30	38.1%	0	0	0.00	0.0%
29	13-Jul	21.75	18.95	40.70	802	6,751	19.71	43.6%	0	0	0.00	0.0%
29	14-Jul	21.90	19.67	41.57	729	7,480	17.54	48.5%	0	0	0.00	0.0%
29	15-Jul	21.67	19.8	41.50	666	8,146	16.05	53.0%	0	0	0.00	0.0%
29	16-Jul	21.50	20.41	41.91	906	9,052	21.62	59.1%	0	0	0.00	0.0%
29	17-Jul	21.75	22.62	44.37	803	9,855	18.10	64.2%	0	0	0.00	0.0%
29	18-Jul	22.58	22.83	45.41	958	10,813	21.10	70.1%	0	0	0.00	0.0%
29	19-Jul	22.41	23.33	45.74	837	11,650	18.30	75.2%	1	1	0.02	0.3%
30	20-Jul	22.66	22.41	45.07	666	12,316	14.78	79.4%	0	1	0.00	0.3%
30	21-Jul	22.41	22.50	44.91	409	12,725	9.11	81.9%	0	1	0.00	0.3%
30	22-Jul	20.42	22.38	42.80	649	13,374	15.16	86.2%	2	3	0.05	1.1%
30	23-Jul	21.40	22.80	44.20	491	13,865	11.11	89.3%	0	3	0.00	1.1%
30	24-Jul	22.25	22.68	44.93	473	14,338	10.53	92.2%	1	4	0.02	1.4%
30	25-Jul	23.33	23.41	46.74	300	14,638	6.42	94.0%	1	5	0.02	1.8%
30	26-Jul	23.35	23.49	46.84	175	14,813	3.74	95.1%	1	6	0.02	2.1%
31	27-Jul	23.00	22.97	45.97	103	14,916	2.24	95.7%	1	7	0.02	2.5%
31	28-Jul	22.75	23.00	45.75	87	15,003	1.90	96.2%	0	7	0.00	2.5%
31	29-Jul	22.32	23.52	45.84	74	15,077	1.61	96.7%	0	7	0.00	2.5%
31	30-Jul	23.25	23.65	46.90	70	15,147	1.49	97.1%	1	8	0.02	2.8%
31	31-Jul	23.08	23.50	46.58	106	15,253	2.28	97.7%	1	9	0.02	3.2%
31	1-Aug	23.15	23.40	46.55	77	15,330	1.65	98.2%	0	9	0.00	3.2%
31	2-Aug	23.16	23.50	46.66	38	15,368	0.81	98.4%	2	11	0.04	3.8%
32	3-Aug	22.48	23.07	45.55	61	15,429	1.34	98.8%	0	11	0.00	3.8%
32	4-Aug	23.18	23.38	46.56	26	15,455	0.56	99.0%	0	11	0.00	3.8%

Stat Week	Date	FISHING EFFORT (hours)			PINK				CHUM			
					Catch		CPUE		Catch		CPUE	
		FW I	FW II	Total	Daily	Cum.	Daily	Cum. Prop.	Daily	Cum.	Daily	Cum. Prop.
32	5-Aug	22.80	23.23	46.03	23	15,478	0.50	99.1%	0	11	0.00	3.8%
32	6-Aug	23.10	23.07	46.17	27	15,505	0.58	99.3%	0	11	0.00	3.8%
32	7-Aug	23.50	23.35	46.85	18	15,523	0.38	99.4%	1	12	0.02	4.2%
32	8-Aug	22.20	22.12	44.32	18	15,541	0.41	99.5%	2	14	0.05	4.9%
32	9-Aug	20.98	20.47	41.45	6	15,547	0.14	99.5%	0	14	0.00	4.9%
33	10-Aug			0.00		15,547		99.5%	0	14		4.9%
33	11-Aug	8.50		8.50	1	15,548	0.12	99.6%	0	14	0.00	4.9%
33	12-Aug	10.52		10.52	2	15,550	0.19	99.6%	0	14	0.00	4.9%
33	13-Aug	23.00		23.00	3	15,553	0.13	99.7%	0	14	0.00	4.9%
33	14-Aug	23.20	4.22	27.42	4	15,557	0.15	99.7%	1	15	0.04	5.5%
33	15-Aug	21.80	22.60	44.40	13	15,570	0.29	99.8%	2	17	0.05	6.2%
33	16-Aug	20.10	21.20	41.30	4	15,574	0.10	99.8%	2	19	0.05	7.0%
34	17-Aug	13.40	14.28	27.68	0	15,574	0.00	99.8%	0	19	0.00	7.0%
34	18-Aug	22.58	22.60	45.18	5	15,579	0.11	99.8%	3	22	0.07	8.0%
34	19-Aug	22.60	22.70	45.30	8	15,587	0.18	99.9%	3	25	0.07	9.1%
34	20-Aug	23.16	23.00	46.16	7	15,594	0.15	99.9%	1	26	0.02	9.4%
34	21-Aug	23.33	23.20	46.53	3	15,597	0.06	99.9%	0	26	0.00	9.4%
34	22-Aug	23.38	23.35	46.73	0	15,597	0.00	99.9%	1	27	0.02	9.8%
34	23-Aug	23.30	23.48	46.78	0	15,597	0.00	99.9%	2	29	0.04	10.5%
35	24-Aug	23.62	14.25	37.87	0	15,597	0.00	99.9%	2	31	0.05	11.3%
35	25-Aug	23.73		23.73	1	15,598	0.04	100.0%	1	32	0.04	12.0%
35	26-Aug	23.63		23.63	0	15,598	0.00	100.0%	1	33	0.04	12.7%
35	27-Aug	23.67		23.67	1	15,599	0.04	100.0%	2	35	0.08	14.0%
35	28-Aug	23.27	10.87	34.14	0	15,599	0.00	100.0%	3	38	0.09	15.4%
35	29-Aug	23.30	23.30	46.60	1	15,600	0.02	100.0%	5	43	0.11	17.1%
35	30-Aug	23.00	23.20	46.20	0	15,600	0.00	100.0%	1	44	0.02	17.5%
36	31-Aug	23.00	22.80	45.80	1	15,601	0.02	100.0%	8	52	0.17	20.3%
36	1-Sep	22.40	22.30	44.70	1	15,602	0.02	100.0%	6	58	0.13	22.4%
36	2-Sep	22.30	23.50	45.80	0	15,602	0.00	100.0%	8	66	0.17	25.2%
36	3-Sep	20.80	22.90	43.70	1	15,603	0.02	100.0%	8	74	0.18	28.1%
36	4-Sep	20.10	22.60	42.70	0	15,603	0.00	100.0%	21	95	0.49	35.9%
36	5-Sep	22.50	22.80	45.30	0	15,603	0.00	100.0%	10	105	0.22	39.5%
36	6-Sep	21.20	23.30	44.50	0	15,603	0.00	100.0%	3	108	0.07	40.5%
37	7-Sep	22.60	22.80	45.40	0	15,603	0.00	100.0%	10	118	0.22	44.1%
37	8-Sep	22.70	22.50	45.20	0	15,603	0.00	100.0%	14	132	0.31	49.0%
37	9-Sep	22.90	22.70	45.60	1	15,604	0.02	100.0%	9	141	0.20	52.2%
37	10-Sep	22.80	22.80	45.60	0	15,604	0.00	100.0%	6	147	0.13	54.3%
37	11-Sep	22.60	22.40	45.00	0	15,604	0.00	100.0%	14	161	0.31	59.2%
37	12-Sep	23.30	22.30	45.60	0	15,604	0.00	100.0%	16	177	0.35	64.8%
37	13-Sep	23.80	21.50	45.30	0	15,604	0.00	100.0%	27	204	0.60	74.3%

Stat Week	Date	FISHING EFFORT (hours)			PINK				CHUM			
					Catch		CPUE		Catch		CPUE	
		FW I	FW II	Total	Daily	Cum.	Daily	Cum. Prop.	Daily	Cum.	Daily	Cum. Prop.
38	14-Sep	22.00	22.80	44.80	0	15,604	0.00	100.0%	30	234	0.67	85.0%
38	15-Sep	22.30	23.10	45.40	0	15,604	0.00	100.0%	13	247	0.29	89.6%
38	16-Sep	22.50	23.60	46.10	0	15,604	0.00	100.0%	1	248	0.02	89.9%
38	17-Sep	22.20	23.90	46.10	0	15,604	0.00	100.0%	3	251	0.07	91.0%
38	18-Sep			0.00	0	15,604		100.0%	0	251		91.0%
38	19-Sep			0.00	0	15,604		100.0%	0	251		91.0%
38	20-Sep			0.00	0	15,604		100.0%	0	251		91.0%
39	21-Sep			0.00		15,604		100.0%	0	251		91.0%
39	22-Sep			0.00	0	15,604		100.0%	0	251		91.0%
39	23-Sep			0.00	0	15,604		100.0%	0	251		91.0%
39	24-Sep			0.00	0	15,604		100.0%	0	251		91.0%
39	25-Sep			0.00	0	15,604		100.0%	0	251		91.0%
39	26-Sep	21.80		21.80	0	15,604	0.00	100.0%	0	251	0.00	91.0%
39	27-Sep	20.00		20.00	0	15,604	0.00	100.0%	0	251	0.00	91.0%
40	28-Sep			0.00		15,604		100.0%	0	251		91.0%
40	29-Sep	20.20		20.20	0	15,604	0.00	100.0%	1	252	0.05	91.8%
40	30-Sep	20.80		20.80	0	15,604	0.00	100.0%	1	253	0.05	92.5%
40	1-Oct	21.80		21.80	0	15,604	0.00	100.0%	3	256	0.14	94.7%
40	2-Oct	22.00		22.00	0	15,604	0.00	100.0%	3	259	0.14	96.9%
40	3-Oct	21.50		21.50	0	15,604	0.00	100.0%	1	260	0.05	97.6%
40	4-Oct	13.50		13.50	0	15,604	0.00	100.0%	2	262	0.15	100.0%

Appendix C.1. Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class											
	2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 23 (June 1 - 7)												
Male												
Sample Size					1			3				4
Percent					10.0			30.0				40.0
Std. Error					10.0			15.3				16.3
Female												
Sample Size					1			5				6
Percent					10.0			50.0				60.0
Std. Error					10.0			16.7				16.3
All Fish												
Sample Size					2			8				10
Percent					20.0			80.0				100.0
Std. Error					13.3			13.3				
Statistical Week 24 (June 8 - 14)												
Male												
Sample Size				1	6			31				38
Percent				1.4	8.7			44.9				55.1
Std. Error				1.4	3.4			6.0				6.0
Female												
Sample Size				1	1			28		1		31
Percent				1.4	1.4			40.6		1.4		44.9
Std. Error				1.4	1.4			5.9		1.4		6.0
All Fish												
Sample Size				2	7			59		1		69
Percent				2.9	10.1			85.5		1.4		100.0
Std. Error				2.0	3.7			4.3		1.4		

Appendix C.1 (cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class											
	2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week	25	(June 15 - 21)										
Male												
Sample Size		2		1	10			62				75
Percent		1.5		0.8	7.7			47.7				57.7
Std. Error		1.1		0.8	2.3			4.4				4.3
Female												
Sample Size				5	4			46				55
Percent				3.8	3.1			35.4				42.3
Std. Error				1.7	1.5			4.2				4.3
All Fish												
Sample Size		2		6	14			108				130
Percent		1.5		4.6	10.8			83.1				100.0
Std. Error		1.1		1.8	2.7			3.3				
Statistical Week	26	(June 22 - 28)										
Male												
Sample Size	3	6		1	29			36				75
Percent	1.8	3.6		0.6	17.5			21.7				45.2
Std. Error	1.0	1.4		0.6	2.9			3.2				3.9
Female												
Sample Size		3		9	10			69				91
Percent		1.8		5.4	6.0			41.6				54.8
Std. Error		1.0		1.8	1.8			3.8				3.9
All Fish												
Sample Size	3	9		10	39			106				167
Percent	1.8	5.4		6.0	23.4			63.5				100.0
Std. Error	1.0	1.7		1.8	3.3			3.7				

Appendix C.1 (cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class											
	2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week	27	(June 29 - July 5)										
Male												
Sample Size		8	5	4	77			69	3			166
Percent		2.6	1.6	1.3	25.0			22.4	1.0			53.9
Std. Error		0.9	0.7	0.6	2.5			2.4	0.6			2.8
Female												
Sample Size		4		13	32			91	1		1	142
Percent		1.3		4.2	10.4			29.5	0.3		0.3	46.1
Std. Error		0.6		1.1	1.7			2.6	0.3		0.3	2.8
All Fish												
Sample Size		12	5	17	109			160	4		1	308
Percent		3.9	1.6	5.5	35.4			51.9	1.3		0.3	100.0
Std. Error		1.1	0.7	1.3	2.7			2.8	0.6		0.3	
Statistical Week	28	(July 6 - 12)										
Male												
Sample Size		7	3		45			36	3			94
Percent		4.2	1.8		26.9			21.6	1.8			56.3
Std. Error		1.5	1.0		3.4			3.2	1.0			3.8
Female												
Sample Size				6	16			50	1			73
Percent				3.6	9.6			29.9	0.6			43.7
Std. Error				1.4	2.3			3.5	0.6			3.8
All Fish												
Sample Size		7	3	6	62			87	4			169
Percent		4.1	1.8	3.6	36.7			51.5	2.4			100.0
Std. Error		1.5	1.0	1.4	3.7			3.8	1.2			

Appendix C.1 (cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class											
	2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week	29	(July 13 - 19)										
Male												
Sample Size		22	2	3	58			34	3		1	123
Percent		10.1	0.9	1.4	26.6			15.6	1.4		0.5	56.4
Std. Error		2.0	0.6	0.8	3.0			2.4	0.8		0.5	3.3
Female												
Sample Size		2		11	4			75	1		2	95
Percent		0.9		5.0	1.8			34.4	0.5		0.9	43.6
Std. Error		0.6		1.5	0.9			3.2	0.5		0.6	3.3
All Fish												
Sample Size		24	2	14	62			109	4		3	218
Percent		11.0	0.9	6.4	28.4			50.0	1.8		1.4	100.0
Std. Error		2.1	0.6	1.7	3.0			3.4	0.9		0.8	
Statistical Week	30	(July 20 - 26)										
Male												
Sample Size	2	20	4	2	40	1		31				100
Percent	1.2	11.7	2.3	1.2	23.4	0.6		18.1				58.5
Std. Error	0.8	2.5	1.2	0.8	3.2	0.6		2.9				3.8
Female												
Sample Size		1		11	10			48	1			71
Percent		0.6		6.4	5.8			28.1	0.6			41.5
Std. Error		0.6		1.9	1.8			3.4	0.6			3.8
All Fish												
Sample Size	2	21	4	13	50	1		79	1			171
Percent	1.2	12.3	2.3	7.6	29.2	0.6		46.2	0.6			100.0
Std. Error	0.8	2.5	1.2	2.0	3.5	0.6		3.8	0.6			

Appendix C.1 (cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class											
	2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week	31	(July 27 - August 2)										
Male												
Sample Size		25	14	5	32			62	1		2	141
Percent		10.1	5.7	2.0	13.0			25.1	0.4		0.8	57.1
Std. Error		1.9	1.5	0.9	2.1			2.7	0.4		0.6	3.1
Female												
Sample Size		1		11	5			82	1		6	106
Percent		0.4		4.5	2.0			33.2	0.4		2.4	42.9
Std. Error		0.4		1.3	0.9			3.0	0.4		1.0	3.1
All Fish												
Sample Size		26	14	16	37			144	2		8	247
Percent		10.5	5.7	6.5	15.0			58.3	0.8		3.2	100.0
Std. Error		1.9	1.5	1.6	2.3			3.1	0.6		1.1	
Statistical Week	32	(August 3 - 9)										
Male												
Sample Size	1	20	13	10	29			40	2	2	1	118
Percent	0.4	8.7	5.7	4.4	12.7			17.5	0.9	0.9	0.4	51.5
Std. Error	0.4	1.9	1.5	1.3	2.2			2.5	0.6	0.6	0.4	3.3
Female												
Sample Size				26	12			69			4	111
Percent				11.4	5.2			30.1			1.7	48.5
Std. Error				2.1	1.5			3.0			0.9	3.3
All Fish												
Sample Size	1	20	13	36	41			109	2	2	5	229
Percent	0.4	8.7	5.7	15.7	17.9			47.6	0.9	0.9	2.2	100.0
Std. Error	0.4	1.9	1.5	2.4	2.5			3.3	0.6	0.6	1.0	

Appendix C.1 (cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class											
	2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week	33	(August 10 - 16)										
Male												
Sample Size		3	3	3	6			9			2	26
Percent		4.6	4.6	4.6	9.2			13.8			3.1	40.0
Std. Error		2.6	2.6	2.6	3.6			4.3			2.2	6.1
Female												
Sample Size				12	10			16	1			39
Percent				18.5	15.4			24.6	1.5			60.0
Std. Error				4.8	4.5			5.4	1.5			6.1
All Fish												
Sample Size		3	3	15	16			25	1		2	65
Percent		4.6	4.6	23.1	24.6			38.5	1.5		3.1	100.0
Std. Error		2.6	2.6	5.3	5.4			6.1	1.5		2.2	
Statistical Week	34	(August 17 - 23)										
Male												
Sample Size	1	4	10	2	19			8			2	46
Percent	1.1	4.3	10.8	2.2	20.4			8.6			2.2	49.5
Std. Error	1.1	2.1	3.2	1.5	4.2			2.9			1.5	5.2
Female												
Sample Size		2		8	11			24	1		1	47
Percent		2.2		8.6	11.8			25.8	1.1		1.1	50.5
Std. Error		1.5		2.9	3.4			4.6	1.1		1.1	5.2
All Fish												
Sample Size	1	6	10	10	30			32	1		3	93
Percent	1.1	6.5	10.8	10.8	32.3			34.4	1.1		3.2	100.0
Std. Error	1.1	2.6	3.2	3.2	4.9			4.9	1.1		1.8	

Appendix C.1 (cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class											
	2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week	35	(August 24 - 30)										
Male												
Sample Size		1	4		2			3			1	11
Percent		4.3	17.4		8.7			13.0			4.3	47.8
Std. Error		4.3	8.1		6.0			7.2			4.3	10.6
Female												
Sample Size					2			10				12
Percent					8.7			43.5				52.2
Std. Error					6.0			10.6				10.6
All Fish												
Sample Size		1	4		4			13			1	23
Percent		4.3	17.4		17.4			56.5			4.3	100.0
Std. Error		4.3	8.1		8.1			10.6			4.3	
Statistical Week	36	(August 31 - Sept. 6)										
Male												
Sample Size		2	3	1	12			4				22
Percent		4.3	6.4	2.1	25.5			8.5				46.8
Std. Error		3.0	3.6	2.1	6.4			4.1				7.3
Female												
Sample Size				3	1		1	17	2		1	25
Percent				6.4	2.1		2.1	36.2	4.3		2.1	53.2
Std. Error				3.6	2.1		2.1	7.1	3.0		2.1	7.3
All Fish												
Sample Size		2	3	4	13		1	21	2		1	47
Percent		4.3	6.4	8.5	27.7		2.1	44.7	4.3		2.1	100.0
Std. Error		3.0	3.6	4.1	6.6		2.1	7.3	3.0		2.1	

Appendix C.1 (cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class											
	2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 37 (Sept. 7 - 13)												
Male												
Sample Size		1	7		4			6				18
Percent		3.1	21.9		12.5			18.8				56.3
Std. Error		3.1	7.4		5.9			7.0				8.9
Female												
Sample Size				1	3			10				14
Percent				3.1	9.4			31.3				43.8
Std. Error				3.1	5.2			8.3				8.9
All Fish												
Sample Size		1	7	1	7			16				32
Percent		3.1	21.9	3.1	21.9			50.0				100.0
Std. Error		3.1	7.4	3.1	7.4			9.0				
Statistical Week 38 (Sept. 14 - 20)												
Male												
Sample Size			1					1				2
Percent			25.0					25.0				50.0
Std. Error			25.0					25.0				28.9
Female												
Sample Size					1			1				2
Percent					25.0			25.0				50.0
Std. Error					25.0			25.0				28.9
All Fish												
Sample Size			1		1			2				4
Percent			25.0		25.0			50.0				100.0
Std. Error			25.0		25.0			28.9				

Appendix C.1 (cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class											
	2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Combined Periods												
Male												
Sample Size	7	121	69	33	370	1		435	12	2	9	1,059
Percent	0.3	4.6	6.5	1.4	15.5	<0.1		22.0	0.3	0.1	0.7	51.4
Std. Error	0.1	0.5	1.7	0.3	1.1	<0.1		2.1	0.1	<0.1	0.3	2.5
Female												
Sample Size		13		117	123		1	641	9	1	15	920
Percent		0.4		5.2	8.0		0.1	33.7	0.6	0.1	0.5	48.6
Std. Error		0.1		0.6	1.8		0.1	2.3	0.2	0.1	0.2	2.5
All Fish												
Sample Size	7	134	69	150	494	1	1	1,078	21	3	24	1,982
Percent	0.3	5.0	6.5	6.5	23.5	<0.1	0.1	55.7	0.9	0.1	1.2	100.0
Std. Error	0.1	0.5	1.7	0.6	2.1	<0.1	0.1	2.4	0.2	0.1	0.4	

Appendix C.2. Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class				
	2000	1999	1998	1997	
	0.2	0.3	0.4	0.5	Total
Statistical Week 32 (August 3 - 9)					
Male					
Sample Size					0
Percent					0.0
Std. Error					0.0
Female					
Sample Size		1	1		2
Percent		50.0	50.0		100.0
Std. Error		50.0	50.0		0.0
All Fish					
Sample Size		1	1		2
Percent		50.0	50.0		100.0
Std. Error		50.0	50.0		
Statistical Week 33 (August 10 - 16)					
Male					
Sample Size		3	1		4
Percent		75.0	25.0		100.0
Std. Error		25.0	25.0		0.0
Female					
Sample Size					0
Percent					0.0
Std. Error					0.0
All Fish					
Sample Size		3	1		4
Percent		75.0	25.0		100.0
Std. Error		25.0	25.0		
Statistical Week 34 (August 17 - 23)					
Male					
Sample Size		6			6
Percent		60.0			60.0
Std. Error		16.3			16.3
Female					
Sample Size	1	3			4
Percent	10.0	30.0			40.0
Std. Error	10.0	15.3			16.3
All Fish					
Sample Size	1	9			10
Percent	10.0	90.0			100.0
Std. Error	10.0	10.0			

Appendix C.2 (cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class				
	2000	1999	1998	1997	
	0.2	0.3	0.4	0.5	Total
Statistical Week	35	(August 24 - 30)			
Male					
Sample Size		8	1	1	10
Percent		57.1	7.1	7.1	71.4
Std. Error		13.7	7.1	7.1	12.5
Female					
Sample Size		1	3		4
Percent		7.1	21.4		28.6
Std. Error		7.1	11.4		12.5
All Fish					
Sample Size		9	4	1	14
Percent		64.3	28.6	7.1	100.0
Std. Error		13.3	12.5	7.1	
Statistical Week	36	(August 31 - Sept. 6)			
Male					
Sample Size		20	3		23
Percent		32.8	4.9		37.7
Std. Error		6.1	2.8		6.2
Female					
Sample Size	2	21	15		38
Percent	3.3	34.4	24.6		62.3
Std. Error	2.3	6.1	5.6		6.2
All Fish					
Sample Size	2	41	19		62
Percent	3.2	66.1	30.6		100.0
Std. Error	2.3	6.1	5.9		
Statistical Week	37	(Sept. 7 - 13)			
Male					
Sample Size	3	24	9		36
Percent	3.6	28.6	10.7		42.9
Std. Error	2.0	4.9	3.4		5.4
Female					
Sample Size	2	29	14	3	48
Percent	2.4	34.5	16.7	3.6	57.1
Std. Error	1.7	5.2	4.1	2.0	5.4
All Fish					
Sample Size	5	53	23	3	84
Percent	6.0	63.1	27.4	3.6	100.0
Std. Error	2.6	5.3	4.9	2.0	

Appendix C.2 (cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

	Brood Year and Age Class				
	2000	1999	1998	1997	
	0.2	0.3	0.4	0.5	Total
Statistical Week 38 (Sept. 14 - 20)					
Male					
Sample Size		21	2		23
Percent		45.7	4.3		50.0
Std. Error		7.4	3.0		7.4
Female					
Sample Size	1	19	3		23
Percent	2.2	41.3	6.5		50.0
Std. Error	2.2	7.3	3.7		7.4
All Fish					
Sample Size	1	40	5		46
Percent	2.2	87.0	10.9		100.0
Std. Error	2.2	5.0	4.6		
Statistical Week 40 (Sept. 28 - October 4)					
Male					
Sample Size		1			1
Percent		12.5			12.5
Std. Error		12.5			12.5
Female					
Sample Size		6	1		7
Percent		75.0	12.5		87.5
Std. Error		16.4	12.5		12.5
All Fish					
Sample Size		7	1		8
Percent		87.5	12.5		100.0
Std. Error		12.5	12.5		
Combined Periods					
Male					
Sample Size	3	83	16	1	103
Percent	0.4	39.0	6.5	0.9	46.8
Std. Error	0.3	4.6	3.3	0.9	3.3
Female					
Sample Size	6	80	37	3	126
Percent	2.2	34.0	16.4	0.4	53.2
Std. Error	1.3	7.0	6.7	0.3	3.3
All Fish					
Sample Size	9	163	54	4	230
Percent	2.7	72.9	23.1	1.3	100.0
Std. Error	1.3	7.5	7.4	0.9	

Appendix D.1. Length composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

		Brood Year and Age Class										
		2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.4	Total
Statistical Week 23 (June 1 - 7)													
Male	Avg. Length					440			587				550
	Std. Error								17.6				91.7
	Sample Size					1			3				4
Female	Avg. Length					535			571				565
	Std. Error								15.8				14.3
	Sample Size					1			5				6
All Fish	Avg. Length					488			577				559
	Std. Error					47.5			11.5				16.5
	Sample Size					2			8				10
Statistical Week 24 (June 8 - 14)													
Male	Avg. Length				530	476			574				558
	Std. Error					16.8			6.5				8.3
	Sample Size				1	6			31				38
Female	Avg. Length				535	505			567		565		564
	Std. Error								5.8				4.1
	Sample Size				1	1			29		1		31
All Fish	Avg. Length				533	480			571		565		560
	Std. Error				2.5	14.8			4.9				4.9
	Sample Size				2	7			59		1		69
Statistical Week 25 (June 15 - 21)													
Male	Avg. Length		468		585	463			571				555
	Std. Error		25.5			14.1			4.3				5.5
	Sample Size		2		1	9			62				74
Female	Avg. Length				564	473			559				553
	Std. Error				8.6	16.5			2.6				4.0
	Sample Size				5	4			46				55
All Fish	Avg. Length		468		568	466			566				554
	Std. Error		25.5		7.8	10.3			2.2				3.6
	Sample Size		2		6	13			108				129

Appendix D.1 (cont'd). Length composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

		Brood Year and Age Class										
		2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 26 (June 22 - 28)													
Male	Avg. Length	380	452		575	471			583				575
	Std. Error		6.8			5.0			5.0				7.7
	Sample Size	1	6		1	29			36				73
Female	Avg. Length		480		557	509			574				562
	Std. Error		18.9		10.6	9.7			3.7				4.1
	Sample Size		3		9	10			69				91
All Fish	Avg. Length	380	461		559	481			577				546
	Std. Error		8.4		9.6	5.2			3.0				4.4
	Sample Size	1	9		10	39			105				164
Statistical Week 27 (June 29 - July 5)													
Male	Avg. Length		464	350	532	475			589	475			519
	Std. Error		5.2	11.0	6.8	3.5			4.1	2.9			5.5
	Sample Size		8	5	1	77			69	3			165
Female	Avg. Length		476		575	496			579	500		605	556
	Std. Error		7.2		4.7	6.1			2.9				3.9
	Sample Size		4		13	32			91	1		1	142
All Fish	Avg. Length		468	350	567	482			583	481		605	537
	Std. Error		4.4	11.0	5.9	3.7			2.4	6.6			3.6
	Sample Size		12	5	16	109			160	4		1	307
Statistical Week 28 (July 6 - 12)													
Male	Avg. Length		461	352		462			594	478			509
	Std. Error		17.6	13.0		3.8			4.2	8.3			4.7
	Sample Size		7	3		45			35	3			93
Female	Avg. Length				582	491			576	490			557
	Std. Error				7.1	7.8			2.1				5.0
	Sample Size				6	16			50	1			73
All Fish	Avg. Length		461	352	582	470			584	491			530
	Std. Error		17.6	13.0	7.1	4.9			2.5	6.6			5.1
	Sample Size		7	3	6	62			85	4			167

Appendix D.1 (cont'd). Length composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

		Brood Year and Age Class										
		2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 29 (July 13 - 19)													
Male	Avg. Length		458	318	565	467			598	468		600	502
	Std. Error		3.3	2.5	23.1	3.2			4.7	6.7			6.2
	Sample Size		22	2	3	58			34	3		1	123
Female	Avg. Length		510		584	501			581	510		580	576
	Std. Error		40.0		3.2	7.2			2.3				2.9
	Sample Size		2		11	4			75	1		2	95
All Fish	Avg. Length		462	318	580	469			586	479		587	535
	Std. Error		4.9	2.5	5.3	3.2			2.3	11.4		6.7	4.5
	Sample Size		24	2	14	62			109	4		3	218
Statistical Week 30 (July 20 - 26)													
Male	Avg. Length	325	456	331	570	460	340		588				491
	Std. Error	15.0	5.0	6.6	20.0	4.0			5.3				7.8
	Sample Size	2	20	4	2	40	1		30				99
Female	Avg. Length		470		578	486			575	475			560
	Std. Error				4.3	14.5			4.2				5.4
	Sample Size		1		11	10			48	1			71
All Fish	Avg. Length	325	457	331	577	465	340		580	475			520
	Std. Error	15.0	4.8	6.6	4.4	4.5			3.3				5.7
	Sample Size	2	21	4	13	50	1		78	1			170
Statistical Week 31 (July 27 - Aug. 2)													
Male	Avg. Length		453	345	593	465			597	570		600	517
	Std. Error		5.2	3.0	3.0	5.8			3.1			15.0	7.6
	Sample Size		24	14	5	32			62	1		2	140
Female	Avg. Length		450		570	487			572	520		579	567
	Std. Error				3.7	14.6			2.3			9.2	2.9
	Sample Size		1		11	5			82	1		6	106
All Fish	Avg. Length		453	345	577	468			583	545		584	538
	Std. Error		5.0	3.0	3.9	5.5			2.1	25.0		8.0	4.8
	Sample Size		25	14	16	37			144	2		8	246

Appendix D.1 (cont'd). Length composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

		Brood Year and Age Class										
		2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 32 (August 3 - 9)													
Male	Avg. Length	325	456	344	575	466			598	440	590	620	509
	Std. Error		6.0	5.1	7.0	5.4			3.0		5.0		8.3
	Sample Size	1	20	11	9	29			39	1	2	1	113
Female	Avg. Length				562	503			566			576	559
	Std. Error				3.8	9.5			2.8			17.1	2.9
	Sample Size				26	12			69			4	111
All Fish	Avg. Length	325	456	344	566	477			577	440	590	585	533
	Std. Error		6.0	5.1	3.4	5.4			2.6		5.0	15.9	4.7
	Sample Size	1	20	11	35	41			108	1	2	5	224
Statistical Week 33 (August 10 - 16)													
Male	Avg. Length		460	347	605	489			597			615	530
	Std. Error		5.8	7.3	5.0	18.4			5.6			5.0	18.0
	Sample Size		3	3	3	6			9			2	26
Female	Avg. Length				558	509			563	500			546
	Std. Error				5.8	8.0			5.2				5.1
	Sample Size				12	10			16	1			39
All Fish	Avg. Length		460	347	560	502			575	500		615	539
	Std. Error		5.8	7.3	6.8	8.5			5.0			5.0	7.8
	Sample Size		3	3	15	16			25	1		2	65
Statistical Week 34 (August 17 - 23)													
Male	Avg. Length	325	431	341	573	472			613			625	472
	Std. Error		12.5	2.7	27.5	8.8			7.4			25.0	14.9
	Sample Size	1	4	10	2	19			8			2	46
Female	Avg. Length		500		562	514			574	520		585	554
	Std. Error				16.0	6.7			3.1				5.3
	Sample Size		2		8	11			24	1		1	47
All Fish	Avg. Length	325	454	341	564	483			584	520		612	513
	Std. Error		16.5	2.1	13.3	7.1			4.2			19.6	8.9
	Sample Size	1	6	10	10	30			32	1		3	93

Appendix D.1 (cont'd). Length composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

		Brood Year and Age Class										
		2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 35 (August 24 - 30)													
Male	Avg. Length	430	338		455			558			630		454
	Std. Error		2.5		5.0			22.4					33.3
	Sample Size	1	4		2			3			1		11
Female	Avg. Length				515			570					561
	Std. Error				15.0			9.9					10.4
	Sample Size				2			10					12
All Fish	Avg. Length	430	338		485			567			630		510
	Std. Error		2.5		18.5			8.8					19.9
	Sample Size	1	4		4			13			1		23
Statistical Week 36 (August 31 - Sept. 6)													
Male	Avg. Length	435	327	605	462			557					460
	Std. Error	10.0	1.7		12.7			4.4					17.3
	Sample Size	2	3	1	12			3					21
Female	Avg. Length			575	495		570	560	525		560		557
	Std. Error			20.2				4.2	15.0				5.0
	Sample Size			3	1		1	17	2		1		25
All Fish	Avg. Length	435	327	583	465		570	560	525		560		513
	Std. Error	10.0	1.7	16.1	11.9			3.6	15.0				10.9
	Sample Size	2	3	4	13		1	20	2		1		46
Statistical Week 37 (Sept. 7 - 13)													
Male	Avg. Length	435	329		436			576					433
	Std. Error		4.4		9.4			6.6					25.7
	Sample Size	1	7		4			5					17
Female	Avg. Length			550	517			559					549
	Std. Error				6.0			7.7					7.3
	Sample Size			1	3			10					14
All Fish	Avg. Length	435	329	550	471			565					486
	Std. Error		4.4		17.2			5.8					17.8
	Sample Size	1	7	1	7			15					31

Appendix D.1 (cont'd). Length composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

		Brood Year and Age Class										
		2001	2000	2000	1999	1999	1999	1998	1998	1998	1997	1997	
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 38 (Sept. 14 - 20)													
Male	Avg. Length			330					565				448
	Std. Error												117.5
	Sample Size			1					1				2
Female	Avg. Length					480			560				520
	Std. Error												40.0
	Sample Size					1			1				2
All Fish	Avg. Length			330		480			563				484
	Std. Error								2.5				54.8
	Sample Size			1		1			2				4
Combined Periods													
Male	Avg. Length	339	451	338	573	464	340		584	486	590	615	502
	Std. Error	12.0	2.1	1.8	5.0	1.6			1.4	10.0	5.0	6.3	2.5
	Sample Size	5	120	67	31	369	1		430	11	2	9	1045
Female	Avg. Length		481		566	501		570	569	505	565	581	557
	Std. Error		7.8		2.1	2.9			1.0	6.3		5.8	1.2
	Sample Size		13		117	123		1	641	9	1	15	920
All Fish	Avg. Length	339	454	338	567	477	340	570	575	494	578	597	529
	Std. Error	12.0	2.1	1.8	2.0	1.5			0.8	6.8	8.8	5.5	1.5
	Sample Size	5	133	67	148	493	1	1	1071	20	3	24	1966

Appendix D.2. Length composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

		Brood Year and Age Class				
		2000	1999	1998	1997	
		0.2	0.3	0.4	0.5	Total
Statistical Week 32 (August 3 - 9)						
Male	Avg. Length					
	Std. Error					
	Sample Size					
Female	Avg. Length		560	575		568
	Std. Error					7.5
	Sample Size		1	1		2
All Fish	Avg. Length		560	575		568
	Std. Error					7.5
	Sample Size		1	1		2
Statistical Week 33 (August 10 - 16)						
Male	Avg. Length		628	675		640
	Std. Error		14.2			15.4
	Sample Size		3	1		4
Female	Avg. Length					
	Std. Error					
	Sample Size					
All Fish	Avg. Length		628	675		640
	Std. Error		14.2			15.4
	Sample Size		3	1		4
Statistical Week 34 (August 17 - 23)						
Male	Avg. Length		647			647
	Std. Error		5.7			5.7
	Sample Size		6			6
Female	Avg. Length	570	600			593
	Std. Error		7.6			9.2
	Sample Size	1	3			4
All Fish	Avg. Length	570	631			625
	Std. Error		8.9			10.0
	Sample Size	1	9			10

Appendix D.2 (cont'd). Length composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

		Brood Year and Age Class				
		2000	1999	1998	1997	
		0.2	0.3	0.4	0.5	Total
Statistical Week 35 (August 24 - 30)						
Male	Avg. Length		627	645	655	632
	Std. Error		4.5			4.9
	Sample Size		7	1	1	9
Female	Avg. Length		675	653		659
	Std. Error			15.9		12.5
	Sample Size		1	3		4
All Fish	Avg. Length		633	651	655	640
	Std. Error		7.1	11.4		6.0
	Sample Size		8	4	1	13
Statistical Week 36 (August 31 - Sept. 6)						
Male	Avg. Length		624	653		628
	Std. Error		6.8	20.3		6.7
	Sample Size		20	3		23
Female	Avg. Length	548	616	647		625
	Std. Error	2.5	7.4	6.3		6.1
	Sample Size	2	21	15		38
All Fish	Avg. Length	548	620	648		626
	Std. Error	2.5	5.0	6.0		4.5
	Sample Size	2	41	18		61
Statistical Week 37 (Sept. 7 - 13)						
Male	Avg. Length	600	606	684		625
	Std. Error	20.0	7.1	12.4		8.1
	Sample Size	3	24	9		36
Female	Avg. Length	568	608	636	644	617
	Std. Error	17.5	5.1	9.7	22.3	5.0
	Sample Size	2	29	14	3	48
All Fish	Avg. Length	587	607	655	644	620
	Std. Error	14.6	4.2	9.0	22.3	4.5
	Sample Size	5	53	23	3	84

Appendix D.2 (cont'd). Length composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2003.

		Brood Year and Age Class				
		2000	1999	1998	1997	
		0.2	0.3	0.4	0.5	Total
Statistical Week 38 (Sept. 14 - 20)						
Male	Avg. Length		623	680		628
	Std. Error		8.2	20.0		8.3
	Sample Size		21	2		23
Female	Avg. Length	550	604	623		604
	Std. Error		6.6	9.3		6.3
	Sample Size	1	18	3		22
All Fish	Avg. Length	550	614	646		616
	Std. Error		5.5	16.1		5.5
	Sample Size	1	39	5		45
Statistical Week 40 (Sept. 21 - October 4)						
Male	Avg. Length		605			605
	Std. Error					
	Sample Size		1			1
Female	Avg. Length		598	660		606
	Std. Error		8.3			11.4
	Sample Size		6	1		7
All Fish	Avg. Length		599	660		606
	Std. Error		7.1			9.9
	Sample Size		7	1		8
Combined Periods						
Male	Avg. Length	600	623	667	655	551
	Std. Error	20.0	3.6	8.5		3.8
	Sample Size	3	82	16	1	102
Female	Avg. Length	559	609	633	644	534
	Std. Error	6.4	3.4	5.1	22.3	3.2
	Sample Size	6	79	37	3	125
All Fish	Avg. Length	564	612	644	650	618
	Std. Error	9.9	2.5	4.9	16.0	2.5
	Sample Size	9	161	53	4	227

Appendix E1. Results of secondary marking study to test for short term tag loss for sockeye captured at the Canyon Island fish wheels, 2003.

Stat. Week	Canadian Catch	Tags Recovered	Fishery Ratio	Fish Examined for 2nd Marks	Number of 2nd Marks	Sample ratio	Fishery Ratio - Sampled Ratio
24	25	0	0.0%	26	0	0.0%	0.0%
25	1,423	19	1.3%	200	2	1.0%	0.3%
26	3232	50	1.5%	198	1	0.5%	1.0%
27	4,748	115	2.4%	200	2	1.0%	1.4%
28	3,393	154	4.5%	200	9	4.5%	0.0%
29	5911	245	4.1%	200	2	1.0%	3.1%
30	6,942	201	2.9%	200	5	2.5%	0.4%
31	3,430	71	2.1%	200	2	1.0%	1.1%
32	2,404	52	2.2%	199	2	1.0%	1.2%
33	1,090	14	1.3%	200	1	0.5%	0.8%
Totals	32,598	921		1,823	26		